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December 1994

Estuarine Ecological Risk Assessment for Portsmouth Naval Shipyard, Kittery, Maine

Phase I: Problem Formulation

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Edited by:

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ADMINISTRATIVE INFORMATION

This work was conducted as part of the US Navy's Installation Restoration program through an interagency cooperative agreement between the Naval Command, Control and Ocean Surveillance Center (NCCOSC), RDT&E Division (NRaD) and the United States Environmental Protection Agency (USEPA), Environmental Research Laboratory, Narragansett (ERLN), with the assistance of Science Applications International Corporation (SAIC), the University of New Hampshire (UNH), Normandeau Associates, Inc., McLaren/Hart Environmental Engineering Corporation, and Ceimic Corporation.

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This report has been reviewed by ERLN and approved for publication. Approval does not signify that the contents reflect the view and policies of USEPA. The report has also been reviewed by PNSY, NORTHDIV, and NRaD. All data and information herein were presented at PNSY Technical Review Committee meetings and public workshops in Kittery, ME, and are approved for public release. Mention of tradenames or commercial products does not constitute either endorsement or recommendation for use by the US Navy or USEPA. This is contribution number 1471 of ERLN and 286 of UNH Jackson Estuarine Laboratory.

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EXECUTIVE SUMMARY

OBJECTIVE

This report presents the findings of the first phase of a research and monitoring project to assess ecological risk from past disposal practices of the Portsmouth Naval Shipyard (Shipyard) on the Great Bay Estuary (estuarine study). The ecological risk assessment follows the ecological risk framework proposed by the EPA Risk Assessment Forum and consists of quantitatively estimating the likelihood of adverse ecological effects resulting from exposure to hazardous waste releases from the Shipyard.

APPROACH

A network of stations was established to develop information on the distribution and effects of contaminants from the Shipyard. The main emphasis was on sampling in depositional areas of the estuary, where fine-grained sediments would accumulate, and where there was the greatest likelihood of measuring contamination. An extensive sampling grid circumscribed the Shipyard on Seavey Island and extended into Clark Cove to provide samples for measuring chemical exposure levels and assessing impacts on marine plants, invertebrates, and fish. Other stations were established upstream, downstream, and across-stream from the Shipyard, in Spruce Creek, ME, and in the York River, ME, to provide information on the possible extent of contamination from the Shipyard, other sources of contamination in the Estuary, and background reference levels of contamination.

RESULTS

Important ecological resources in the estuary were evaluated and areas that appeared to be under ecological stress were identified. The occurrences of ecological stress were spread throughout the study area and were not limited to specific locations, although several apparently stressed areas occurred in the immediate vicinity of the Shipyard. The complex stress patterns could be an indication that there was a variety of stressor sources in the estuary. Chemical analysis of contaminant concentrations in sediment, water, and tissue samples determined that lead (Pb), mercury (Hg), nickel (Ni), zinc (Zn), chromium (Cr), and, to a lesser degree, polychlorinated biphenyls (PCBs) are contaminants of concern in the estuary. Analysis of chemical contaminant concentrations in tissues of mussels collected from the estuary showed high concentrations of Cr, Ni, Zn, and polycyclic aromatic hydrocarbons (PAHs) in the upper estuary. The lower estuary had indications of Pb and Hg contamination, which exceeded the background concentrations of those elements several fold. In addition, there was evidence that Hg was biologically available to the biota of the estuary.

Field and laboratory investigations indicated limited toxicological impact and the absence of severe environmental contamination, although there was evidence of elevated exposure to heavy metals in the estuary. Mussel tissue concentrations of organic contaminants were relatively low. However, heavy metal concentrations of Hg, Pb, Cr, and Ni were high relative to Mussel Watch data collected from the northeast region of the United States. Chemical residues in lobster and winter flounder were below action levels for the consumption of seafood that have been established by the US Food and Drug Administration.

The stress and contamination levels measured indicate possible chronic exposure which could cause long-term impact. Most likely contamination originated from a variety of sources which cannot be completely identified at this stage of the study. Results from the ongoing investigation can be used to identify and eliminate sources of current contaminant migration from the Shipyard. The monitoring program, initiated as part of this study, will help measure the success and progress of corrective actions by providing data that can be used to determine if conditions in the estuary are getting better, staying the same, or getting worse.

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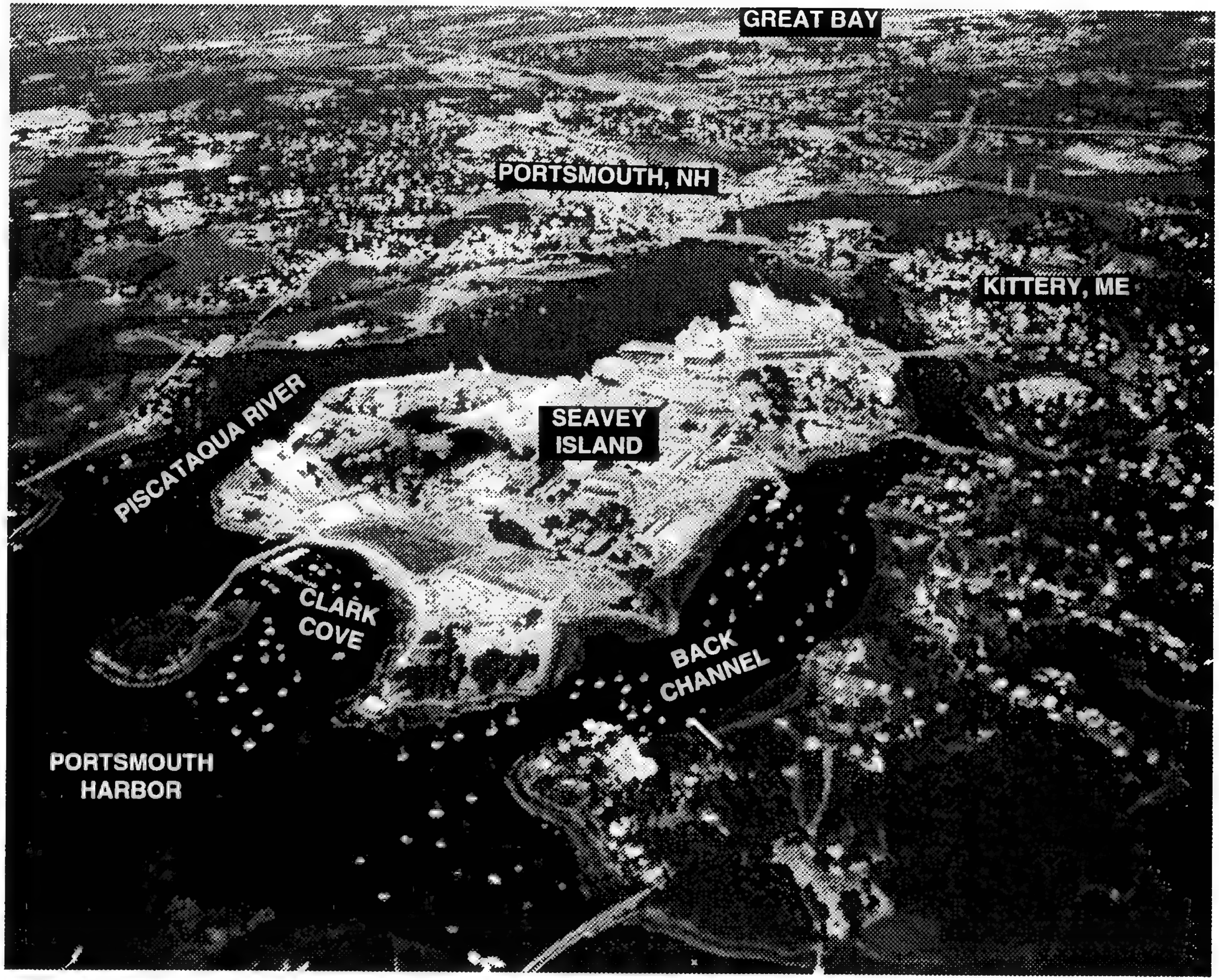
ABBREVIATIONS AND ACRONYMS*

ACR	acute chronic ratio
AET	apparent effects threshold
ANOVA	analysis of variance
AP	Adams Point, Durham, NH
BC	Back Channel, Piscataqua River, ME
BOD	biological oxygen demand
BU	background units
CC	Clark Cove, Seavey Island, ME
cfu	colony-forming units
CLP	Contract Laboratory Program
CRM	certified reference material
DBC	dibutylchlorendate
DBT	dibutyltin
DO	dissolved oxygen
DRMO	Defense Reutilization and Marketing Office
DYNHYD3	dynamic hydrodynamic model, version 3
ECD	electron capture detection
EMAP	Environmental Monitoring and Assessment Program
EPA	Environmental Protection Agency
EPAID	EPA identification number assigned by ERLN
ER-L	effects range low
ERLN	Environmental Research Laboratory, Narragansett, RI
ER-M	effects range medium
FAV	final acute value
FCV	final chronic value
FDA	US Food and Drug Administration
GB	Great Bay, NH
GBE	Great Bay Estuary, NE and ME
GC	gas chromatography
GFAA	graphite furnace atomic absorbtion
GSO	Graduate School of Oceanography, University of Rhode Island
HDPE	high-density polyethylene
HMW	high molecular weight
HSWA	Hazardous and Solid Waste Amendments
ICP	inductively coupled plasma
I/E	internal-to-external ratio

*See table 3-10, p. 3-104, for abbreviations used for chemical analyses.

JEL	Jackson Estuarine Laboratory, University of New Hampshire
LAB	linear alkylbenzene
LC_{50}	lethal concentration to 50 percent of test organisms
LIS	Long Island Sound
LOQ	limit of quantification
LSW	low slack water
MBT	monobutyltin
MC	main channel
MDL	method detection limit
MESO	Marine Environmental Support Office of the Navy's Environmental Protection Support Service
MF	membrane filtration
MOA	Memorandum of Agreement
MPN	most probable number
MS	mass spectroscopy
NAI	Normandeau Associates, Inc., Bedford, NH
NCBC	Naval Construction Battalion Center, Davisville, RI
NCCOSC	Naval Command, Control and Ocean Surveillance Center, San Diego, CA
NHFG	New Hampshire Fish and Game
NICI	negative ion chemical ionization
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NOAA-COP	National Oceanic and Atmospheric Administration Coastal Ocean Program
NODC	National Ocean Data Center
NOSC	Naval Ocean Systems Center (now Naval Command, Control and Ocean Surveillance Center, Research, Development, Test and Evlauation Division)
NPDES	National Pollution Discharge Elimination System
NRaD	NCCOSC Research, Development, Test and Evaluation Division, San Diego, CA (formerly NOSC)
NRC	National Research Council of Canada
NS&T	NOAA Status and Trends Program
NS	not significant
OCN	octachlornaphthalene
OEP	Ocean Engineering Program, University of New Hampshire
OM	organic matter
PAC	polycyclic aromatic compound
PAH	polycyclic aromatic hydrocarbon
PBS	phosphate buffered saline
PC	particulate carbon
PCB	polychlorinated biphenyl
PE	performance evaluation
PH	Portsmouth Harbor, Piscataqua River

PHEN	phenanthrene
PNSY	Portsmouth Naval Shipyard
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
PR	Piscataqua River, NH and ME
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROV	remotely operated vehicle
SAIC	Science Applications International Corp.
SD	standard deviation
SDS	sodium dodecyl sulfate
SFG	Scope for Growth
SIM	selective ion monitoring
SOP	standard operating procedure
SQC	sediment quality criteria
SR	Squamscott River, NH
SRM	standard reference material
SWMU	solid-waste management unit
TAM	trialkylamines
TBT	tributyltin
TOC	total organic carbon
TOXIWASP	toxicological water analysis simulation program (dispersion model)
TSS	total suspended solids
UNH JEL	University of New Hampshire, Jackson Estuarine Laboratory, Durham, NH
UNH OEP	University of New Hampshire, Ocean Engineering Program
URI	University of Rhode Island
USEPA	United States Environmental Protection Agency
VOC	voltaile organic compound
VP	Virginian Province of Environmental Monitoring and Assessment Program
WHOI	Woods Hole Oceanographic Institution
WQC	water quality criteria
YH	York Harbor, York River, ME
YR	York River, ME
YYMMDD	abbreviation for date with year, month and day identified by two characters each



Frontispiece. Aerial view of lower Piscataqua River in the Great Bay Estuary, New Hampshire and Maine. (Photograph by F. T. Short, July 1991.)

1.0 INTRODUCTION

This report presents the findings of the first phase of a research and monitoring project to assess the ecological risk of hazardous waste released from the Portsmouth Naval Shipyard (Shipyard) in Kittery, ME, on the Great Bay Estuary (estuarine study). The ecological risk assessment follows the ecological risk framework proposed by the USEPA Risk Assessment Forum and consists of quantitatively estimating the likelihood of adverse ecological effects resulting from exposure to hazardous waste releases from the Shipyard. The purpose of the study was to assess the potential environmental effects from past, present, and future releases of hazardous substances from the Shipyard to the estuary. The study was developed within the context of an ecological risk assessment to determine where contaminants would accumulate, to measure exposure levels, and to evaluate whether contaminants were adversely affecting the ecology of the estuary.

Due to the complex and dynamic nature of the Piscataqua River and Great Bay estuarine system, a team of experts was assembled to conduct a detailed assessment of ecological processes within the estuary and determine the extent of environmental impact that could be related to past Shipyard operations. The project was initiated in August 1991 as a cooperative effort between scientists and engineers from the Naval Command, Control and Ocean Surveillance Center, RDT&E Division (NRaD) San Diego, CA, the USEPA Environmental Research Laboratory Narragansett, RI (ERLN), the Jackson Estuarine Laboratory (JEL) and Ocean Engineering Program (OEP) of the University of New Hampshire (UNH), Woods Hole Oceanographic Institution (WHOI), the University of Rhode Island (URI) Graduate School of Oceanography (GSO), Science Applications International Corp. (SAIC), Normandeau Associates Inc. (NAI), McLaren/Hart Environmental Engineering Corp., and Ceimic Corp.

A network of 34 stations was established to develop information on the distribution and effects of contaminants from the Shipyard. The main emphasis was on sampling in depositional areas of the estuary, where fine-grain sediments accumulate and where the likelihood of measuring contamination was maximized. An extensive sampling grid circumscribing Seavey Island and extending into Clark Cove was designed to provide samples for measuring sediment chemistry and toxicity, and to facilitate collections of mussels, eelgrass, and benthic organisms (see frontispiece for locations). Other stations were established upstream, downstream, and across-stream from the Shipyard, in Spruce Creek, ME, and in the York River, ME, to provide information on the possible extent of contamination from the Shipyard, other sources of contamination in the Estuary, and background reference levels of contamination.

The estuarine study consisted of two phases. Phase I (conducted from September 1991 to May 1993) was designed to develop the ecological risk assessment framework needed to determine if there was evidence that contaminants from the Shipyard were impacting the ecology of the estuary. Phase II was developed to address specific hypotheses resulting from the analysis of Phase I data and to verify and quantify the ecological risk of contaminants released from the Shipyard. Components of the Phase II investigation were initiated in the Summer of 1992, with completion scheduled for the fall of 1994 (NCCOSC et al., 1994). In addition, a monitoring program is being developed to support long-term environmental compliance requirements for the Shipyard.

Phase I findings have distinguished the important ecological resources in the estuary and identified areas that appear to be under ecological stress. The occurrences of ecological stress were spread throughout the study area and were not limited to specific locations. The complex stress patterns could be an indication that there was a variety of stressor sources in the estuary. Chemical analysis of contaminant concentrations in sediment, water, and tissue samples determined that lead (Pb), mercury (Hg), nickel (Ni), zinc (Zn), chromium (Cr), and, to a lesser degree, polychlorinated biphenyls (PCBs) are contaminants of concern in the estuary. Analysis of chemical contaminant concentrations in tissues of organisms collected from the estuary showed higher concentrations of Cr, Ni, Zn, and polycyclic aromatic hydrocarbons (PAHs) in the upper estuary. The lower estuary had indications of Pb and Hg contamination, which exceeded the background concentrations of those elements several fold. In addition, there was evidence that Hg was biologically available to the biota of the estuary.

Overall, no major ecological impacts or widespread environmental contamination were detected. Mussel tissue concentrations of organic contaminants were relatively low. However, heavy metal concentrations of Hg, Pb, and Cr were high relative to Mussel Watch data collected from the northeast region of the United States. Chemical residue levels in lobster and winter flounder were below action levels for the consumption of seafood that have been established by the US Food and Drug Administration (FDA).

The stress and contamination levels measured were indications of chronic exposure, which could be early-warning indications of possible long-term impact. Most likely the contamination measured was from a variety of sources and could not necessarily be attributed to particular responsible parties. Results from the ongoing investigation can be used to identify and eliminate sources of current contaminant migration from the Shipyard. The monitoring program, initiated as part of this study, will help measure the success and progress of corrective actions by providing data that can be used to determine if conditions in the estuary are getting better, staying the same, or getting worse.

This report is organized according to the assessment and monitoring activities that took place during the Phase I investigation. Section 2 presents the USEPA Risk Assessment Forum's Framework for Ecological Risk Assessment and describes how the Framework was applied to assess ecological risks from the Shipyard. Section 2 also identifies the rationale for determining ecological risks and explains the necessity for the specific monitoring and assessment tasks that were conducted by the investigators. An initial conceptual model was developed which aided in identifying the assessment and measurement endpoints to be evaluated by the risk assessment, and assisted in developing the hypotheses that were tested by the data collection activities.

Section 3 presents the results of the data-collection activities. Each subsection, prepared by the Principal Investigator responsible for conducting the task, presents the objectives, methods, and results from each of the data-collection tasks performed. The data reports are (a) the textural analysis of bottom sediments (Section 3.1); (b) the determination of sediment toxicity (Section 3.2); (c) the characterization of water-column conditions (Section 3.3); (d) a determination of water-column toxicity (Section 3.4); (e) an assessment of microbial contamination in water and sediments (Section 3.5); (f) the measurement of current patterns around Seavey Island (Section 3.6); (g) analyses of eelgrass (Section 3.7), fucoid algae (Section 3.8), lobster and flounder (Section 3.9), mussel (Section 3.10), and benthic (Section 3.12) habitats in the lower estuary; (h) an assessment of deployed mussel physiology (Section 3.11); (i) the characterization of

chemical contamination in marine sediments, tissues, and water samples from the estuary (Section 3.13); and (j) an evaluation of organic chemical markers in Portsmouth and York Harbors (Section 3.14).

Section 4 provides a synthesis of the data presented in Section 3. The synthesis relates the data report findings to the ecological risk assessment framework, identifies contaminants of concern, and characterizes effects on ecological resources. Section 4 also presents the revised conceptual model which was updated based on the Phase I findings and refined to focus on developing the key hypotheses necessary for completing the ecorisk assessment and verifying the conclusions during Phase II of the investigation.

Section 5 contains the references cited for all sections. The Appendices provide all the validated raw data collected during the study. A list of abbreviations and acronyms used in the report is provided immediately following the table of contents. The frontispiece is provided to aid the reader in locating places in the estuary.

The estuarine study is developing information on the fate of contaminants released, the effect of the contaminants present in the estuary, the potential accumulation of contaminants through the food chain, and the overall impact on the ecology of the estuary. The onshore study performed by McLaren/Hart Environmental Engineering Corp. provides information on the source and strength of stressors located in the Shipyard, the routes and rates of releases, and the effects of exposure to inhabitants (human and nonhuman) of Seavey Island. In combination, the two studies provide a scientifically sound, comprehensive database from which the ecological and human health risk assessments can be made. Together the onshore and offshore studies provide data and technical information to make informed management decisions for the Shipyard's cleanup program.

2.0 FRAMEWORK FOR ESTUARINE ECOLOGICAL RISK ASSESSMENT

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BACKGROUND

The Shipyard is located on 278-acre Seavey Island situated in the Piscataqua River on the Maine and New Hampshire border (figure 2-1). The mission of the Shipyard is to "Provide quality repair, overhaul, modernization, and refueling of nuclear submarines in a safe, timely and cost effective manner."[1] To fulfill this mission the Shipyard must comply with the provisions of the Resource Conservation and Recovery Act (RCRA) permit for the treatment, storage, and disposal of hazardous materials used at the Shipyard. The Shipyard was issued an RCRA Hazardous and Solid Waste Amendments (HSWA) Corrective Action Permit. Special conditions of the HSWA permit require the Navy to characterize the potential impact of hazardous materials on surface water, sediment, and biota within the estuary and to evaluate exposures and associated risks to the environment from hazardous materials used at the Shipyard.[2] About two-thirds of the Shipyard is involved with heavy industrial operations. There are three operating drydocks on the south and west sides of the island, numerous storm water outfalls are located around the Shipyard, and industrial waste is collected for pretreatment before it is discharged for disposal at the municipal waste treatment plant in Kittery, ME. There are thirteen solid-waste management units (SWMUs) that are being studied for the RCRA Facility Investigation (RFI) required by the HSWA permit (figure 2-2). These include former disposal areas, underground storage tanks, industrial waste outfalls (ceased discharge in 1975), storage areas (still in operation), and a 25-acre landfill at which hazardous wastes were disposed from 1945 to 1975 (Fred C. Hart Associates, 1989; NEESA, 1983; McLaren/Hart Environmental Engineering Corp., 1991).

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[1]Sign located near the main entrance to Portsmouth Naval Shipyard.

[2]US Environmental Protection Agency, Approval With Conditions of the RCRA Facility Investigation (RFI) Proposal for Portsmouth Naval Shipyard (PNS), of 15 January 1991.

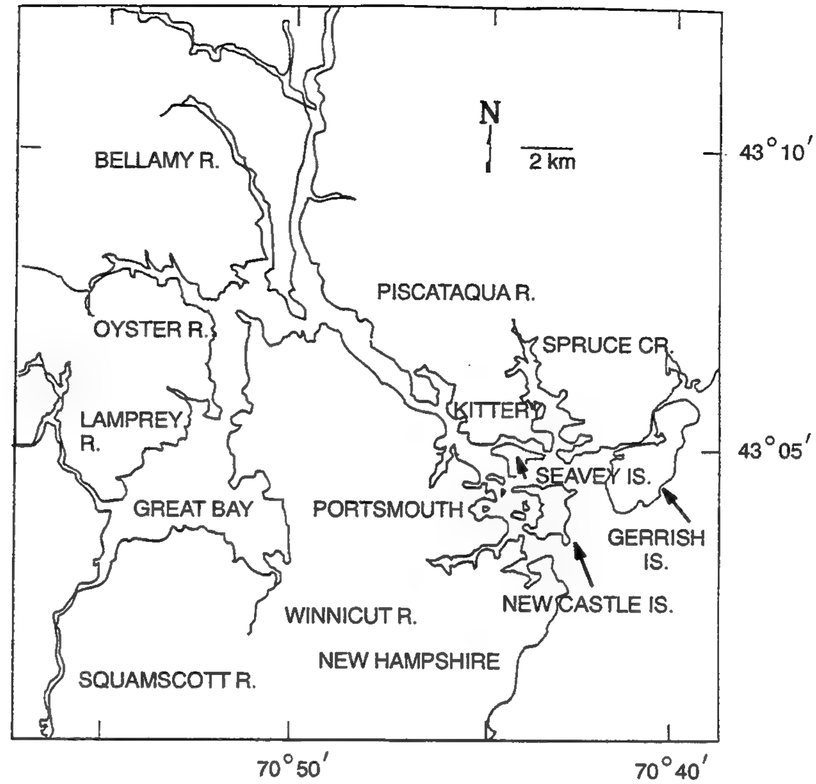

Figure 2-1. Map of the Great Bay Estuary, showing the location of Portsmouth Naval Shipyard on Seavey Island in Portsmouth Harbor in the lower Piscataqua River.

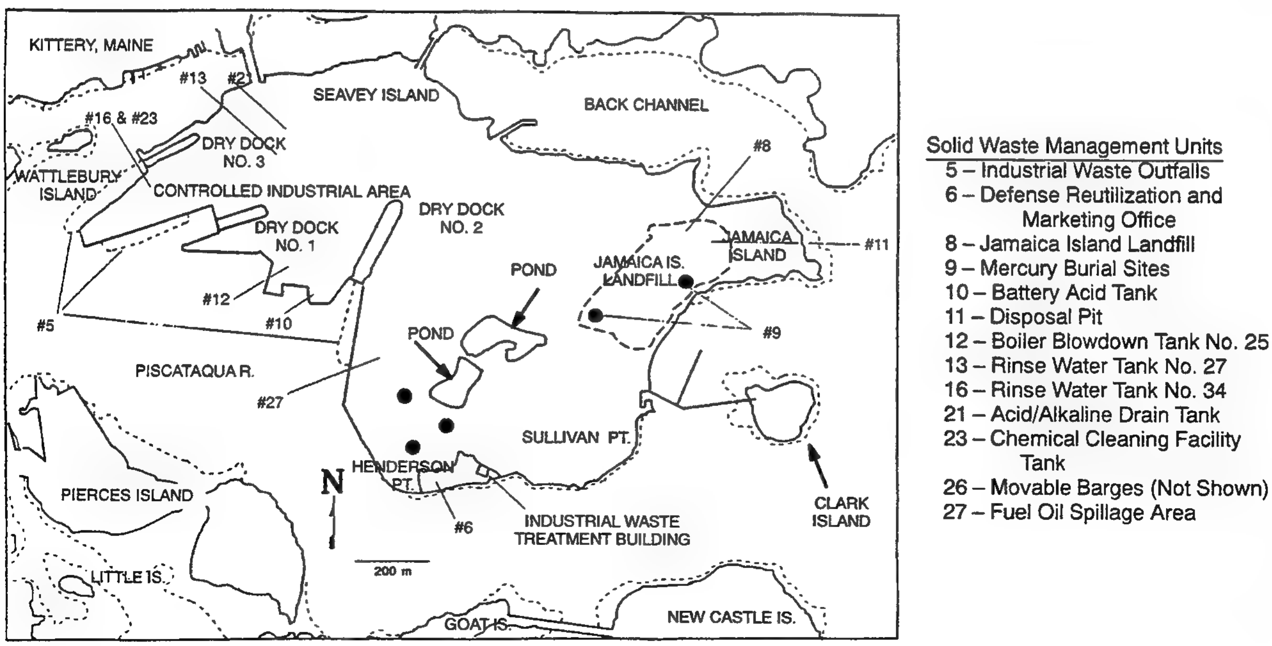

Figure 2-2. Location of SWMUs at Portsmouth Naval Shipyard.

The area surrounding the Shipyard and Portsmouth Harbor is very scenic and includes Kittery Point and Gerrish Island in Maine and New Castle and Pierces Islands in New Hampshire. Portsmouth Harbor is the only deep water harbor in New Hampshire and is busy with traffic that consists of oil barges and submarines operating at the Shipyard, as well as tugs and ships operating out of the New Hampshire Port Authority Cargo Terminal. Fishing trawlers, lobster boats, and recreational vessels are also frequently present in the estuary. Parts of the shoreline are heavily developed, and the Shipyard, commercial docks, and marinas dominate the landscape. However, numerous parks and historic areas impart a scenic beauty and charm to the area. Most ships wait for favorable tides before moving up the narrow river because of exceptionally strong currents which can reach up to 4 knots in the lower Piscataqua River. The Great Bay and Piscataqua River estuarine system extends about 20–25 miles into New Hampshire and is fed by seven rivers. Much of the estuarine shoreline is undeveloped, but industrial activities in southeast New Hampshire, such as foundries and tanneries, discharged wastes into the estuary, especially from 1940 to 1976. The recently closed Pease Air Force Base (now the Pease International Tradeport) is located on the east side of Great Bay. There are 35 permitted discharges into the estuary. The largest volume of discharge is from the more than 16 municipal sewage treatment plants serving communities adjacent to the estuary (Short, 1992). The estuary is generally well-mixed with a salinity gradient from the mouth of the harbor to the tributary rivers. Fresh water is found upstream of the old mill dams on the tributary rivers.

The research and monitoring activities reported here provide a foundation for assessing the ecological risk to the estuary of past and present Shipyard operations. The project is aimed at developing a comprehensive assessment strategy focusing on the impact of the shipyard on the estuary. The data will provide technical data and information which can be used to satisfy the special conditions of the RCRA permit, to identify potential risks, to select appropriate corrective actions, and to comply with current and future environmental requirements.

The Naval Command Control and Ocean Surveillance Center (NCCOSC; formerly the Naval Ocean Systems Center (NOSC)) and the USEPA Environmental Research Laboratory, Narragansett (ERLN) developed a cooperative research and monitoring project to conduct the estuarine ecological risk assessment for the Shipyard in accordance with an existing Memorandum of Agreement (MOA) between NCCOSC and ERLN. Under this agreement, case studies were developed to characterize the risks of hazardous waste disposal at Navy sites which could potentially impact aquatic ecosystems. The agreement provides the opportunity to develop and refine methodologies for examining ecological risks associated with anthropogenic wastes discharged into the marine environment by applying ecological risk methods to specific case studies (MOA between Naval Ocean Systems Center and Environmental Research Laboratory Narragansett, in Munns et al., 1991).

The research and monitoring strategy developed for the estuarine ecological risk assessment for the Shipyard builds upon techniques and methods applied for a marine ecological risk assessment pilot study performed at NCBC Davisville, in Narragansett Bay, RI. The pilot study in Narragansett Bay, performed in accordance with the MOA, provided significant information and experience in assessing ecological risks to marine systems from past hazardous waste disposal practices (NOSC and ERLN, 1990; Johnston et al., 1990; Munns et al., 1991; Mueller et al., 1992; Munns et al., 1992; Munns et al., 1994; Johnston and Nixon, 1994). Improvements and refinements of methods for assessing ecological risks have been incorporated into the strategy employed in the study being conducted for the Shipyard and Piscataqua River.

OBJECTIVE

The Estuarine Ecological Risk Assessment Case Study (hereinafter referred to as the estuarine study) has two objectives: (1) to develop methods and techniques for assessing ecological risks; and (2) to provide data and technical information to determine the extent and degree of environmental impacts of activities at the Portsmouth Naval Shipyard on the Piscataqua River and Great Bay Estuary.

Two operational phases of the estuarine study were identified to meet these objectives. Phase I involved a detailed assessment of existing environmental quality in the lower Piscataqua River and its relationship to the Shipyard (ERLN and NOSC, 1991). This determination was based on comparisons of measures of contamination and biological health made at sites in the immediate vicinity of the Shipyard with similar measures made at reference sites within the Piscataqua and Great Bay Estuary, as well as the York River estuary in Maine. Emphasis was placed on sampling and analyzing samples of sediments, waters, and biological resources. Because there are several potential sources of environmental contamination in the estuary, unique chemical markers were explored to establish the relative strengths of different contaminant sources (Pruell and Bowen, 1991). This information and supporting knowledge of marine environmental quality provided a context to evaluate the ecological condition of the lower Piscataqua River, and aided in the preliminary identification of potential risks associated with Shipyard operations.

Phase II of the estuarine study involves performing activities to verify Phase I results and to quantify marine ecological risks associated with hazardous material used and disposed of at the Shipyard (NCCOSC/ERLN, 1992; NCCOSC et al., 1994). Phase II activities, initiated in July 1992, have focused on (1) developing experiments to describe the response of ecological systems to Shipyard-associated contaminants, and (2) modeling and evaluating contaminant transport and fate in the estuary. Further chemical marker research will be directed towards fingerprinting contaminants to determine relative contaminant source contributions. Together with Phase I findings, this information will be used to develop the final NCCOSC/ERLN Estuarine Ecological Risk Assessment. In addition, a long-term monitoring strategy will be developed to provide a baseline to verify environmental health and to help determine the effectiveness of corrective measures and risk management decisions.

The technical activities for the estuarine study were conducted by several parties. Specific tasks conducted during Phase I and the lead laboratory responsible for execution are listed in table 2–1. Rationale behind each data collection activity is provided below. Oversight and coordination of the project was the responsibility of NCCOSC and ERLN. The University of New Hampshire's Jackson Estuarine Laboratory (UNH JEL) and Ocean Engineering Program (UNH OEP) performed the majority of field sampling and measurement activities. Normandeau Associates, Inc. (NAI), performed the sediment sampling, otter trawling, and benthic invertebrate analyses. Woods Hole Oceanographic Institution assisted in conducting seismic surveys of the lower estuary. Ceimic Corp., under subcontract to McLaren/Hart Environmental Engineering Corp., performed the marine chemical analysis, and McLaren/Hart Environmental Engineering Corp. performed data validation using Contract Laboratory Protocol guidelines. The Environmental Testing Center of Science Applications International Corp. (SAIC), Narragansett, conducted the toxicity tests and analyzed physiological responses to deployed mussels, and the Marine Environmental Quality Branch of NCCOSC analyzed organotin concentrations in mussel tissues. Technical assistance in the preparation of work plans, standard operating procedures

(SOPs), and project documentation and data management support were provided by the Applied Aquatic Sciences Division of SAIC and Computer Sciences Corp., respectively.

Table 2-1. Phase I tasks and the lead laboratory (or laboratories) responsible for their execution.

Task	Lead Laboratory
1. Historical Overview	UNH JEL (see Short, 1992)
2. Sediment Characterization	
a. Sampling Plan	NCCOSC/ERLN/UNH JEL
b. Collection	UNH JEL/NAI
c. Chemical Contaminants	Ceimic Corp.
d. Geophysical/Microbial	UNH JEL
e. Toxicity Assessment	SAIC Narragansett
f. Sediment Distribution Map	UNH JEL
g. Chemical Markers	ERLN
3. Water-Column Characterization	
a. Sampling Plan	NCCOSC/ERLN/UNH JEL and OEP
b. Collection	UNH JEL
c. Physical and Biological	UNH JEL
d. Chemical Contamination	Ceimic Corp.
e. Toxicity Assessment	SAIC Narragansett
f. Current Measurements	UNH OEP
4. Biological Resources	
a. Sampling Plan	NCCOSC/ERLN/UNH JEL
b. Collection	UNH JEL/NAI
c. Distribution/Abundance	UNH JEL
d. Chemical Contamination	Ceimic Corp.
e. Benthic Community Analysis	NAI
f. Caged Mussel Deployment	SAIC Narragansett/UNH JEL

ECOLOGICAL RISK ASSESSMENT FRAMEWORK

This project was implemented following guidance provided by the EPA Risk Assessment Forum's "Framework for Ecological Risk Assessment" (USEPA, 1992; Norton et al., 1992). The framework is intended to provide a logical overarching structure for conducting risk assessments and to enhance uniformity among assessments. This latter intent is particularly important to decision makers who must evaluate risks associated with various management options, perhaps as estimated by different assessors. The framework is intended to be general with respect to the nature of the stressors and the ecological systems involved in any given assessment. It therefore has utility in assessments involving both chemical and nonchemical stressors, and all types of ecological systems.

The framework itself consists of three major components, or steps (figure 2-3). During the first of these, *Problem Formulation,* planning and scoping activities are directed toward the delineation of the overall goals, objectives, scope, and activities of the assessment. The *Analysis* step consists of data collection and modeling exercises to characterize stressor magnitude in time and space, and to define the responses of ecological systems as a result of exposure to the stressor. The methods appropriate for the Analysis step may be stressor-specific, but also depend upon the nature of the ecological systems identified to be at risk. Stressor and effects information are synthesized into estimates of risk in the *Risk Characterization* step. Ideally, these estimates are quantitative with respect to the level of risk expected under different exposure scenarios. Depending upon the kinds of information available, however, only qualitative estimates of risk may be possible. In addition, an evaluation of the uncertainties and a discussion of the assumptions underlying the assessment completes the risk analysis.

The risk assessment framework (figure 2-3) is iterative so that new information and ideas can be incorporated to redefine the problems. Considerations of regulatory requirements, public concerns, societal values, fiscal constraints, and other issues relative to the assessment enter into the framework during *Problem Formulation.* Monitoring data from past and ongoing investigations provides additional insight to frame the problem.

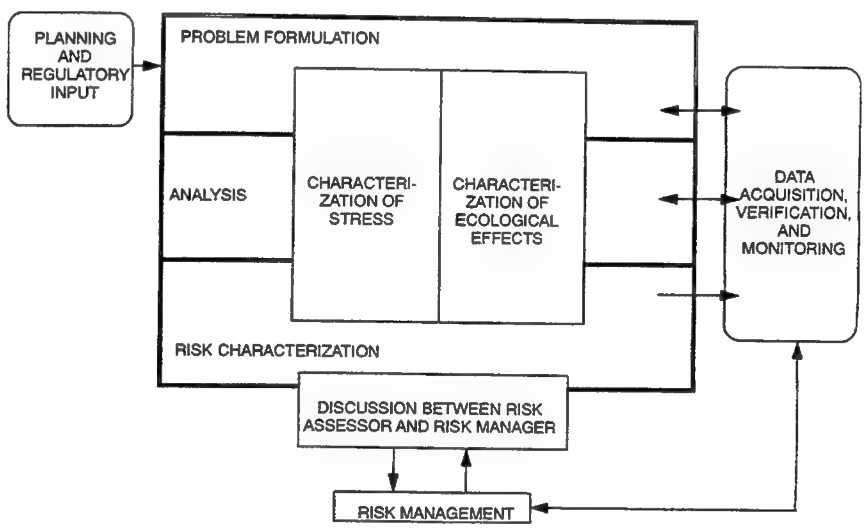

Figure 2-3. Framework for ecological risk assessment.

PROBLEM FORMULATION

Defining the problem is the most critical part of an ecological risk assessment. The scope and limitations of the assessment must be established in a way to maximize the collection of salient and useful information within available resource constraints. A systematic approach to Problem Formulation (figure 2-4) begins with an initial identification of a potential problem. The problem may be formulated by presuming potential risk based upon the characteristics of recognized stressors, or through the direct observation of ecological effects in the system. Properties of stressors (e.g., physical and chemical) are directly relevant to defining potential exposure pathways, the temporal and spatial boundaries of the assessment, and ecosystems at risk. Biological properties (e.g., toxicity and community structure) are directly relevant to the

type of ecological responses that could be expected and are, therefore, appropriate endpoints for use in the assessment. The identification of potential stressors, ecological effects, and ecosystems at risk is the key to initially defining the nature and extent of the problem. Once identified, these considerations lead to the selection of endpoints appropriate for evaluation in the assessment. Generally, two types of endpoints can be delineated (Suter, 1990; USEPA, 1992): those which symbolize environmental conditions or processes that are valued but which may not be directly quantifiable (*assessment endpoints*), and those which represent quantifiable indicators of the state of important conditions or processes (*measurement endpoints*). Criteria important to the selection of appropriate assessment and measurement endpoints have been discussed by Suter (1989, 1990, 1993) and others (Gentile et al., 1988; Munns et al., 1989). They generally include considerations of relevancy (with respect to the ecological system, stressor, and societal values), applicability, and utility. Assessment endpoints focus the goals of the assessment on important environmental values.

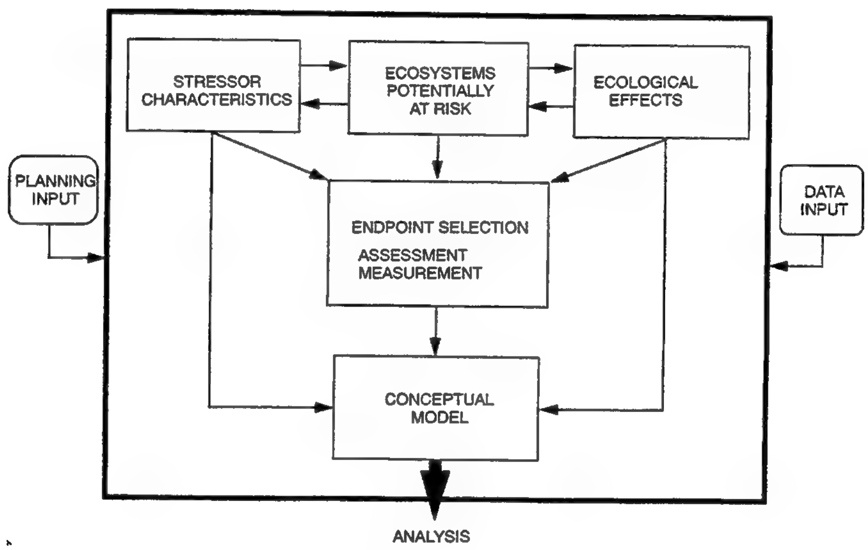

Figure 2-4. Problem formulation phase of ecological risk assessment.

The development of a conceptual model, based upon an understanding of the problem, represents the final step in Problem Formulation. This model takes the form of a series of working hypotheses describing the origin, transport, fate, and ecological effects of the stressor. It defines the scope of the assessment, bounds the spatial and temporal scales of investigation, delineates potentially affected components of the ecosystem, and identifies key measurement and modeling activities for the subsequent analysis. The conceptual model also describes the relationship of measurement endpoints to assessment endpoints. Ideally, the conceptual model should undergo rigorous review by risk managers, scientific peers, and the public to ensure that all concerns have been addressed and that the assessment will yield a scientifically sound and credible analysis of risk.

ANALYSIS

Evaluating the significance of exposure to ecological effects is the goal of *Analysis*. Two parallel lines of investigation take place in an interactive fashion: characterization of exposure and characterization of ecological effects. These analyses ultimately lead to the development of

profiles describing stressor exposure and the responses of ecological systems to that exposure. The analyses seek to develop relationships between incremental increases in stressor and incremental increases in ecological responses. Interaction between exposure and effects analyses helps ensure that the profiles are compatible and can be integrated into statements of risk.

Exposure characterization involves the quantification of stressor patterns with respect to magnitude, temporal duration and frequency, and spatial scale of occurrence in the environment. Typically, measurement or modeling activities are used to define these patterns. Measurement activities may involve attempts to directly quantify the stressor through field sampling programs or may involve the use of indicators of exposure (such as exposure biomarkers). Although generally associated with a greater degree of uncertainty, modeling exercises can be used to predict exposure conditions which cannot readily be measured. Models also provide an enhanced understanding of the processes involved in determining stressor patterns and enable the prediction of patterns under different exposure scenarios.

Attributes of the stressor and of the ecosystem (biotic and abiotic) influence exposure. Such considerations are particularly cogent when defining the spatial and temporal pattern of co-occurrence between the stressor and the particular ecological system of interest (e.g., individual organisms and communities), and therefore the potential for exposure. For example, a metal contaminant may be measured or predicted to occur in depositional sediments, but sediment characteristics (e.g., high acid volatile sulfide) may inhibit metal bioavailability to benthic species.

Ecological effects are quantified by determining the relationships between relevant exposure patterns and the resulting responses of ecological systems, in terms of the measurement endpoints identified during *Problem Formulation.* As with analyses of exposure, both measurement and modeling activities are useful in this process. Several approaches may be used to establish effects profiles, ranging from the identification of toxicity thresholds (e.g., sediment and water quality criteria and LC_{50}'s[3]), to the development of stressor–response models. This latter approach relates the degree of response observed in the measurement endpoint to the level of exposure experienced by the target system. The models provide a means of quantifying effects over a range of exposures, incorporating natural variability in response thresholds, and establishing evidence for causal relationships (source → stressor → exposure → effect). Stressor–response models can be developed from available data or generated in the course of laboratory or field investigations.

Throughout the Analysis step, attention should be given to the uncertainties associated with estimates of exposure and effects. A consideration of these uncertainties provides the basis for determining the degree of confidence to be associated with analysis results, and helps to identify gaps in the understanding of environmental processes.

RISK CHARACTERIZATION

The final step in ecological risk assessment involves a synthesis of the exposure and ecological effects information to determine the likelihood of occurrence of adverse ecological effects. Depending upon the nature of information obtained and types of analyses conducted, estimates of risk may be either qualitative or quantitative. Examples of qualitative assessments include those which compare single estimates of exposure to an ecological benchmark

[3]LC_{50} is a lethal concentration to 50% of the organisms.

concentration (e.g., water quality criterion). If the ratio of the estimate of exposure to the ecological benchmark exceeds some predetermined level (typically 1.0), a presumption of risk is concluded. Although widely used when more detailed exposure and effects information is lacking, such quotient methods (Barnthouse et al., 1986) offer little in the way of evaluating the probability that an adverse effect has occurred or will occur. Moreover, risk quotients lack a means of evaluating the incremental changes in exposure (e.g., remediation).

More desirable approaches to quantifying risk include those which compare distributions of exposure and ecological responses. When risk is defined as the joint probability of exposure and effects, these methods incorporate variability in both stressor concentration and ecological response. In expressing risk as a probability (between 0 and 1), these methods also obviate the problems associated with open-ended risk quotients. Another accepted approach to estimating risk involves simulation modeling. This approach incorporates a knowledge of ecological processes directly into risk quantification, and can utilize information regarding both variability and uncertainty in parameter estimates. Probabilistic estimates also result from this method of risk characterization.

Regardless of the approach taken to estimate risk, some form of uncertainty analysis should be conducted before assessment results are communicated to the risk manager. This analysis provides insight into the degree of confidence which should be associated with the estimate of risk. It also serves to evaluate the effects of uncertainty on the entire assessment, and ideally identifies approaches which can be taken to reduce uncertainty. Uncertainty analysis often leads to additional research to enhance an understanding of environmental processes and systems.

APPLICATION OF THE FRAMEWORK IN THE ESTUARINE STUDY

The remainder of this section describes the application of the risk assessment framework in the estuarine study. Primary attention is given to the initial consideration of the early steps of *Problem Formulation* and the development of an initial conceptual model. This material is followed by a description of the sampling and measurement activities undertaken to complete a refinement of the conceptual model relating Shipyard stressor sources to potential adverse effects. The revised conceptual model and the development of preliminary Analysis and Risk Characterization activities are provided in Section 4.0.

STRESSORS AND ECOLOGICAL EFFECTS

The estuarine study was initiated in response to the regulatory conditions of the HSWA Corrective Action Permit through the recognition of a number of potential stressors associated with Shipyard operations. These include chemical contaminants linked with the SWMUs and ongoing industrial activities of the Shipyard. Based upon information obtained during the RFI (Fred C. Hart Associates, 1989), the list of chemical stressors includes heavy metals (e.g., Hg, Pb, Cr, and Zn) and organic compounds (e.g., PAHs, PCBs, and pesticides). In response to the regulatory requirements of the HSWA Corrective Action Permit and because of their toxicological importance and persistence in estuarine systems, these chemicals were identified as the primary stressors of concern in this assessment.

The transport, transformation, and fate characteristics of chemical contaminants in estuarine systems have been the focus of considerable investigation over the past several decades. Although aspects of contaminant behavior are complex and not completely understood, a

simplified description is that they either remain in a dissolved state following their introduction into a body of water or will become associated with waterborne particulate material which ultimately settles in depositional areas. Individual chemical species differ with respect to their degree of affinity to the particulate-bound phase. For instance, hydrophobic organic contaminants generally associate quite rapidly with organic matrices on the surface of particles, whereas hydrophilic contaminants remain in a dissolved state nearly indefinitely. In either state, chemical stressors may be transported by prevailing water currents and may be transformed from their original state through geochemical and biological processes.

The co-occurrence of a chemical stressor with biological systems is generally necessary for ecological effects to ensue. Even with such co-occurrence, the contaminant must be bioavailable to have a direct effect. Bioavailability is influenced by a number of factors, including the degree of binding to particulates and other surfaces. Organisms can be exposed to these stressors through various routes, including dermal and respiratory contact and the ingestion of contaminated food. Once exposed, biological systems can experience a range of direct toxicological effects, the ramifications of which may be manifested at all levels of ecological hierarchy. Indirect effects, such as trophic transfer, can also result from exposure to chemicals which bioaccumulate.

Possible sources of chemical stress from the Shipyard include the thirteen SWMUs (figure 2-2) and potential releases from ongoing industrial operations. Among the most important of these sources are—

- the 25-acre Jamaica Island hazardous waste landfill
- the former industrial waste outfalls
- past disposal areas, hazardous waste storage areas, and underground storage tanks
- industrial and waterfront operations

Other potential stressors cogent to this assessment include nutrients and pathogens associated with sanitary services for the facility, although Shipyard sewage currently is processed by the Kittery municipal system. Like classical chemical contaminants, nutrients undergo transport, transformation, and fate processes which affect their ultimate availability to biological systems. Water-column concentrations are of primary concern in aquatic systems. A typical direct response to alterations in the availability of nutrients is a shift in plant species' abundances. Indirect effects may ramify throughout consumer trophic levels, resulting in changes to overall community structure and ecosystem function.

The USEPA National Air and Radiation Environmental Laboratory, in conjunction with the US Naval Sea Systems Command, has routinely surveyed Navy facilities for radionuclides since 1963 as part of an existing program within EPA's Office of Radiation Programs. The estuarine environment around the Shipyard has been evaluated in an ongoing fashion as part of this program (e.g., USEPA, 1979, 1991), which has corroborated Navy monitoring results that found no significant radiological environmental impact from Shipyard activities. In recognition of this, and because radionuclides are not regulated under RCRA, they were excluded from the current assessment.

In the initial evaluation of stressors potentially impacting the estuary, it was recognized that potential sources other than the Shipyard exist in the greater estuarine system. An activity undertaken early in the estuarine study was the compilation of existing ecological and

environmental information regarding the Piscataqua River and Great Bay Estuary which identified such sources (Short, 1992). Among the more important of these sources are—

- nearby sewage treatment facilities in Kittery, ME, and Portsmouth, NH, which are potential sources of nutrient, pathogen, and chemical stress
- industrial and commercial operations in the watershed which introduce chemical and thermal stress
- other regulated hazardous waste sites, including Pease International Trade Port and Watts FluidAir, which are potential sources of chemical stress

Additionally, nonpoint sources to the estuary (such as storm water runoff), dredging, and boating activities all potentially contribute to the introduction of chemical, physical, biological, nutrient, and pathogen stress to the estuarine system. The Phase I sampling program, fashioned to provide data useful in Problem Formulation and the development of the conceptual model for this assessment, was designed in part to clarify the definition of Shipyard contributions. An appreciation of these other sources also provided the primary impetus behind the initiation of chemical and microbial markers research. These activities were directed toward the identification of unique "fingerprints" of specific sources which could be used to determine their contribution to identified or predicted risk.

ECOSYSTEMS POTENTIALLY AT RISK

The estuarine ecological profile of the Great Bay Estuary (Short, 1992) identifies a number of estuarine systems and habitat types located in the vicinity of the Shipyard. The behavior of Shipyard stressors following their introduction to the Piscataqua River suggested several of these to be potentially at risk, among them—

- pelagic communities, including plankton and fish
- infaunal benthic communities in sediment depositional areas
- soft- and hard-bottom epibenthic communities
- communities associated with eelgrass beds
- communities associated with salt marshes

Although excluded from evaluation in this assessment, stressors initially introduced to the estuary may affect terrestrial systems, including human populations. For example, shellfish contaminated with chemicals or pathogens may be consumed by shorebirds and other animals, resulting in direct or indirect biological effects. These issues were addressed as part of the onshore study and human health risk assessment.

ENDPOINT SELECTION

Based upon the preliminary considerations of stressors, their potential ecological effects, and ecosystems which may be at risk, and in keeping with the conditions of the HSWA permit, a number of assessment endpoints were identified as being of primary concern in this assessment. As indicated in table 2-2, these included the health of each of the ecosystems identified above, as well as the general quality of estuarine sediments and water. An evaluation of these endpoints was the focus of the Phase I data-gathering activities described in the following sections.

A direct measurement of the assessment endpoints was not possible. Several measurement endpoints were therefore employed as indicators of these higher level ecological values (table 2-2). Most of these measurement endpoints have been used in other studies (Munns et al., 1988; Gentile et al., 1988), and have proven to be informative indicators of ecological status in estuarine systems with respect to the stressors identified as important in this assessment (Munns et al., 1989; Munns et al., 1991). Many serve a dual purpose by providing information relevant to two or more assessment endpoints. For instance, the primary productivity of phytoplankton offers insight into general water quality as well as into the health of the pelagic community. Several provide insight into the condition of valued natural resource populations, such as for endpoints addressing lobster and flounder abundance, condition, and contamination. Taken together, the measurement endpoints listed in table 2-2 define the data-collection activities conducted during Phase I (or to fill information gaps in Phase II).

Table 2-2. Assessment and measurement endpoints.

Assessment Endpoint	Measurement Endpoint
Health of Pelagic Community	Flounder abundance, condition, and tissue residues Phytoplankton biomass
Health of Infaunal Benthic Community	Species abundance and diversity
Health of Epibenthic Community	Lobster abundance, condition, and tissue residues Fucoid alga abundance and tissue residues Mussel abundance, condition, and tissue residues
Health of Eelgrass Community	Eelgrass abundance, morphometrics, and tissue residues
Health of Salt Marsh Community	Cord grass abundance, morphometrics, and tissue residues
Water Quality	Water toxicity to sea urchin gametes Water toxicity to deployed mussel physiology Metal concentrations in water Nutrient concentrations in water Microbial concentrations in water Hydrodynamic and hydrographic characteristics of the water column
Sediment Quality	Sediment toxicity to amphipods Chemical concentrations in sediment Microbial concentrations in sediment Geotechnical characteristics and distribution of sediments

INITIAL CONCEPTUAL MODEL

The initial conceptual model describes the release of contaminants from Shipyard sources to the estuarine environment (figure 2-5), and the subsequent aquatic transport and fate of those contaminants (figure 2-6). The primary sources are hypothesized to be the Jamaica Island landfill, the Defense Reutilization and Marketing Office (DRMO), mercury burial vaults, and industrial activities at the western end of Seavey Island (see figure 2-2). Contaminants are transported to the river predominately via surface and ground (seep) water routes, although the minor atmospheric transport of chemical pollutants originating from the DRMO and bound to soil and dust particles may also occur. Biological transport probably is unimportant to the estuary-ward movement of Shipyard contaminants.

Upon introduction to the river, contaminants are likely to be dispersed rapidly over much of the lower estuary because of the dynamic tidal regime of this system. The arrows in figure 2-5 are intended to depict the hypothesized relative magnitudes of source strength, as well as general patterns of waterborne transport. Significant contaminant mass is hypothesized to be flushed from the estuary by the net transport of water to the Atlantic Ocean.

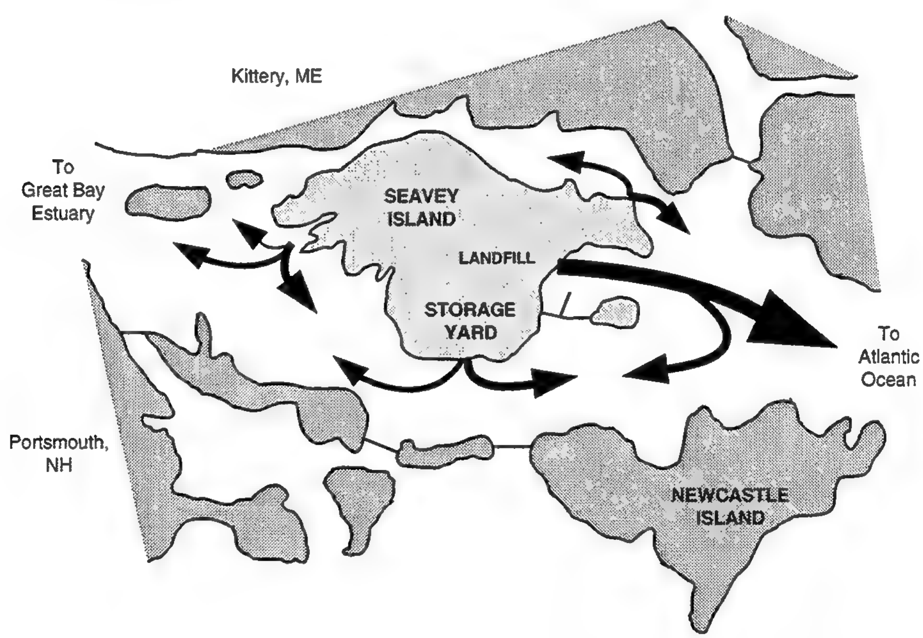

Figure 2-5. Initial first-tier conceptual model; water-column transport of contaminants.

The second tier of the model provides details of the aquatic behavior of contaminants leading to the exposure of ecological systems and identifies potential ecological effects (figure 2–6). The geographical configuration of Seavey Island and resulting hydrodynamic patterns, along with the locations of contaminant sources, lead to two hydrodynamically connected spatial subsystems in the estuary: (1) Clark Cove and (2) the greater estuary proper. Clark Cove is outside the main flow of tidal currents and represents a major area of sediment deposition immediately adjacent to the Jamaica Island landfill. Contaminants released into the embayment are likely to experience a longer residence time than do those released elsewhere around the facility. Similar processes will affect the long-term transport and fate of contaminants in each subsystem.

As described earlier, the short-term behavior of contaminants in the water column depends upon their affinity to particles. Metals such as cadmium will remain primarily in a dissolved state, whereas metals such as lead will become particle-bound fairly rapidly. Individual molecules will sorb and desorb in a dynamic fashion, maintaining an apparent equilibrium relative to sorption state. Dissolved contaminants are transported to other parts of the estuary by prevailing patterns of current. Bound contaminants will be transported horizontally in association with particles, but may also settle to the bottom in depositional areas. Once these contaminants are on the bottom, local currents may result in the resuspension of bedload transport of sediment, resulting in a further distribution of the contaminants. Additional deposition may bury earlier settling particles, removing them from contact with ecological systems. Partitioning dynamics similar to those in the water column will occur in the sediments in response to the geochemical microenvironment of those sediments. Contaminants may be available to biological systems in both the water column and surficial sediments, resulting in biological uptake or direct toxicological effects.

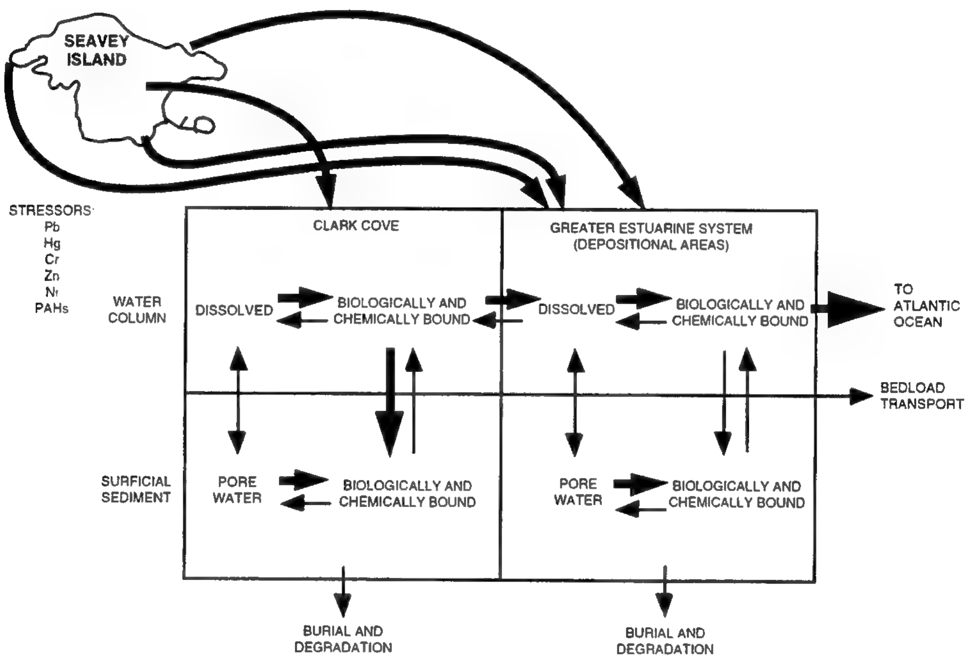

Figure 2-6. Initial second-tier conceptual model; stressor transport, transformation, and fate.

DATA-COLLECTION ACTIVITIES

Initial data-collection activities in support of Problem Formulation consisted of identifying and measuring stressor levels and the current status of ecological systems in the lower estuary. Sediment samples were collected and measured to determine chemical and microbial contamination levels, toxicity to amphipods (*Ampelisca abdita*), geophysical characteristics, evidence of chemical markers, and benthic community composition. Water-column measurements consisted of determining the levels of chemical and microbial contaminants in river and seep waters (areas where water was observed draining from Seavey Island into the river), toxicity to sea urchin sex cells (*Arbacia punctulata*), hydrographic characteristics (temperature, salinity, dissolved oxygen, and pH), nutrient levels, chlorophyll concentrations, and current regimes around Seavey Island.

The impacts on biological resources were measured by determining the abundance, distribution, and chemical contaminant tissue burdens of mussels (*Mytilus edulis*), eelgrass (*Zostera marina*), lobster (*Homarus americanus*), flounder (*Pseudopleuronectes americanus*), rockweed algae (*Ascophyllum nodosum*), and oysters (*Crassostrea virginica*). These species were selected because they represent a range of phyla and trophic levels indigenous to the estuary, are ecologically important members of the estuarine community, and add economic and aesthetic value to New Hampshire and Maine. Additionally, these species have been used in a variety of previous ecological studies so that results obtained from the estuarine study can be compared to existing databases. The tissue residue levels of seafood can also be used to determine human health risks (e.g., Nocito et al., 1989).

A field sampling program involving a total of 34 stations was developed to obtain information on the distribution and effects of contaminants associated with the Shipyard. Depositional areas, or areas where fine-grained sediments accumulate, were targeted because the fine-grained material maximizes the likelihood of observing contaminant signals. The original program included 21 stations in the lower Piscataqua River (figure 2-7), two reference stations located in the nearby York River in Maine (see figure 2-7), and 9 stations extending from Portsmouth Harbor into the upper reaches of the Great Bay Estuary (figure 2-8). Because there are several potential sources of environmental contamination in the lower Piscataqua River, stations within the harbor were positioned to enhance the likelihood of detecting contamination originating from the Shipyard, as well as to evaluate the extent of the transport of released contaminants. Of these 23 stations, nine were located to circumscribe Seavey Island in association with the specific sites of possible contaminant releases (SWMUs). In addition, a grid of six stations was placed within Clark Cove (see figure 2-7) to evaluate potential releases from the Jamaica Island landfill located on Seavey Island. Two other sites near the Shipyard (designated 10A and 12A) were added to the original sampling plan based on field observations of their biotic characteristics and their proximity to SWMUs. Sampling activities at Station 12A were limited to mussels and eelgrass, and only mussels and algae were collected at Station 10A.

Stations were also selected to characterize the ecology of the lower Piscataqua River and its tributaries. Two stations were located on the west shore of the Piscataqua River adjacent to Seavey Island, one upstream and one downstream of the Pierce Island (Portsmouth) wastewater treatment plant. To identify the upriver transport of contaminants, two stations were located upstream from the Shipyard on opposite sides of the river. These sites were colocated with the southernmost eelgrass monitoring stations established for the Great Bay National Estuarine Research Reserve, a program of the New Hampshire Fish and Game Department and the National Oceanic and Atmospheric Administration's (NOAA) Coastal Ocean Program (Short, 1992). Two stations were also positioned downstream of the Shipyard to establish if contaminants were being transported down the estuary. The two stations selected in Spruce Creek, ME, north of the Shipyard will help establish whether contamination from the Shipyard is moving upstream or whether the Spruce Creek drainage itself is a source of contamination to the lower estuary. This creek has a possible contaminant source farther upstream (Watts Fluid Air), although water from Portsmouth Harbor near the Shipyard could also be a source of contamination.

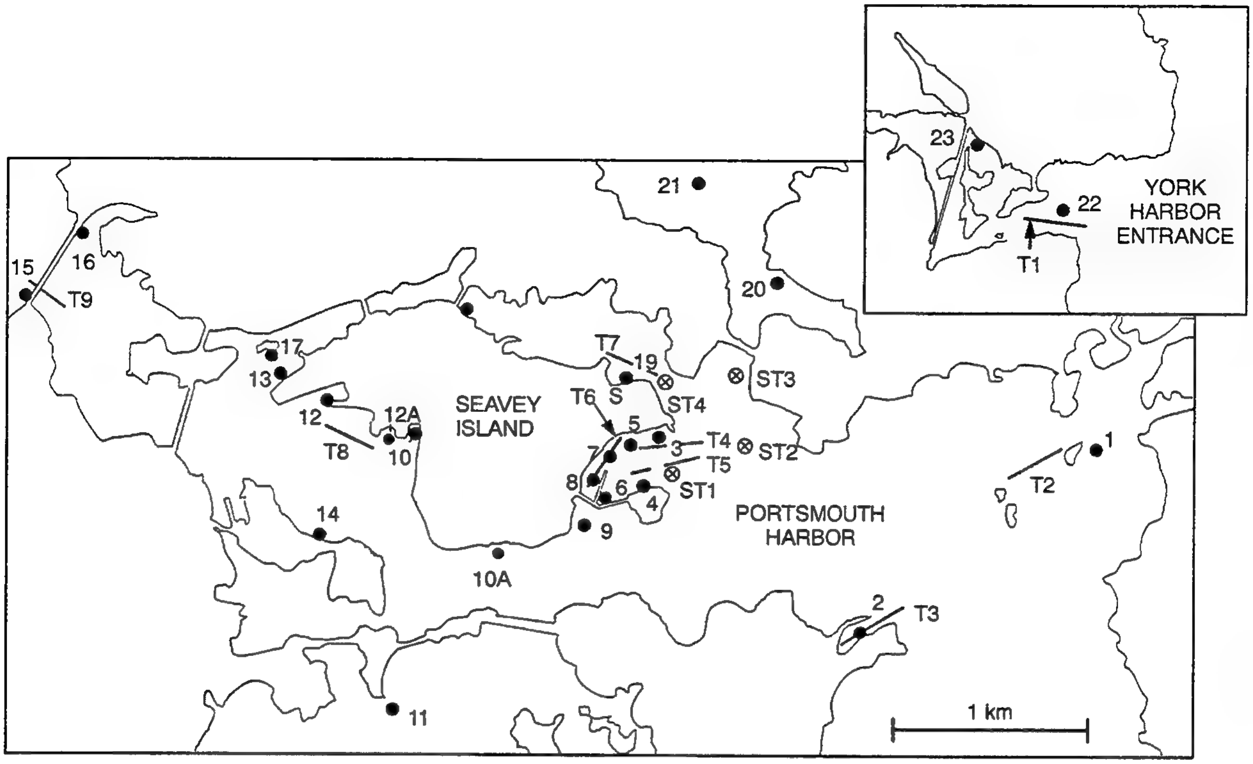

Figure 2-7. Locations of sampling stations in the lower Piscataqua and York Rivers. (See table 2-3 for sampling activities.)

Table 2-3. Sampling activities and stations. (See figures 2-7 and 2-8 for station locations.)

Sampling Activity	Stations
Sediment Samples	
Surface Grabs	1–23
Cores	1–8, 10–17, 19, 20, 21
Water-Column Samples	
Synoptic	1–23
Monthly	1, 8, 10, 15, 16, 23
Seep Samples	S (S1, S2, S3)
Mussel Samples	
Synoptic	1–12, 14, 16–28, 10A, 12A
Quarterly	1, 3, 9, 10, 17, 18, 23, 12A
Deployments	2, 8, 10, 15, 18, 22
Oyster Samples	26, 28, 29, 31
Lobster and Founder Trawls	T1–T9
Benthic Community	1–23
Eelgrass Samples	
Synoptic	1–3, 9, 11, 14, 17–19, 22–25, 27–33
Quarterly	1, 3, 9, 10, 17, 18, 23, 12A
Rockweed Algae Samples	3, 8, 9, 10, 17, 19, 22, 10A
Current-Meter Deployments	ST1–ST4

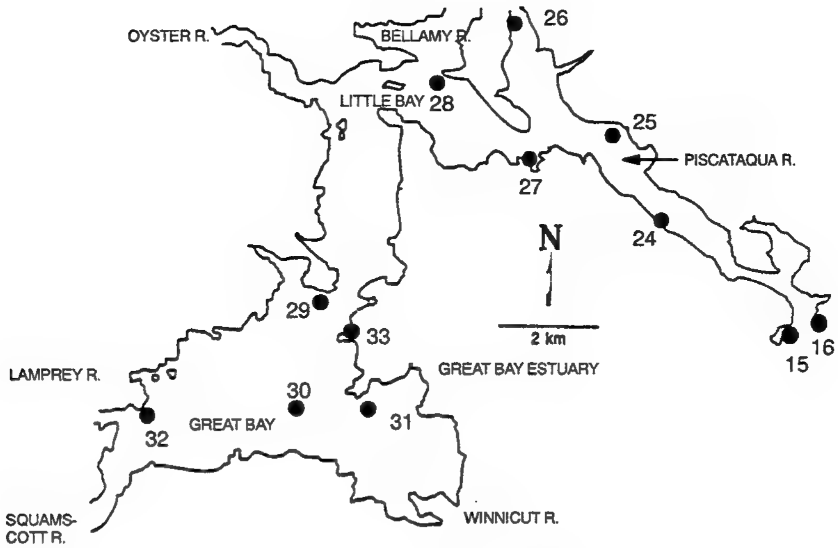

Figure 2-8. Locations of the upper estuary transect of stations in the Great Bay Estuary.

Reference stations were selected in York River, ME, and the Great Bay Estuary. The two York River stations provide measurements of ecological conditions in a nearby estuarine system with similar ecological characteristics, but without sources of industrial contamination. The nine Great Bay Estuary stations (figure 2-6) were positioned along an upper estuary transect to provide information on the potential far-field gradient of contaminants. Data obtained from the analysis of these samples were used to identify potential contaminant sources upstream from the facility. The transect stations, sampled synoptically to evaluate biological resources, were colocated with Great Bay National Estuarine Research Reserve stations (Short, 1992).

The remainder of this document describes the information-gathering activities undertaken in Phase I to complete the Problem Formulation step of the risk assessment. Following the presentation of individual sampling and measurement procedures and results (Section 3.0), data are summarized to support the completion of the conceptual model in Section 4.0. Phase II of the estuarine study (NCCOSC et al., 1994) will complete the estuarine ecological risk assessment. Taken together with the data and information being developed by the onshore study (McLaren/Hart Environmental Engineering Corp., 1992), the estuarine study will provide the technical data and information necessary to satisfy the environmental requirements of the Shipyard.

3.0 DATA REPORTS

3.1 TEXTURE OF BOTTOM SEDIMENTS AT SAMPLING STATIONS IN THE LOWER PISCATAQUA RIVER

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INTRODUCTION

A complete textural description of the sediments at sampling sites located in the lower Piscataqua River and York Harbor was needed to help assess the potential sites of sediment and pollutant deposition and to provide sediment data for the microbiological, benthic, botanical, chemical, and toxicological studies at Stations 1–23. Therefore, grab samples and gravity cores were collected at the stations and analyzed for size statistics, moisture, and organic content.

OBJECTIVES

An objective of the first phase of the study (September to December 1991) was to characterize the sediments of the lower Piscataqua River Estuary by determining in detail the textural characteristics of the substrate samples taken at the 21 stations (1–21) established in the vicinity of the Shipyard and the two stations in the York River (22 and 23). The locations of these sampling stations is shown in figure 3-1.

The following tasks were conducted to determine the textural characteristics of the sediments at Stations 1–23:

- Four replicate surface sediment grab samples taken by NAI with a Shipex grab sampler at each station were analyzed for moisture content, particulate organic content (loss on ignition), and grain size characteristics (gravel–sand–mud ratios, sand–silt–clay ratios, mean size, sorting, skewness and kurtosis).
- Gravity cores were taken at 19 of 23 stations to make an initial assessment of the stratigraphic characteristics of the upper sediment column, determine sediment thicknesses, and provide subsurface samples for other analyses (sedimentological, microbiological, and chemical contamination). A subset of core samples was also analyzed for the same textural characteristics as the surface grabs.

METHODS

Textural analyses were conducted on ~100 to 150 grams (wet weight) of sediment taken from the samples supplied by NAI. A small subsample (1 to 3 cc) was placed in an aluminum drying dish. Moisture and loss on ignition (approximating particulate organics) contents were determined by weight loss on drying and ignition, respectively. The remainder of the sample was placed in a large glass beaker and treated with H_2O_2 to remove the readily oxidizable organics, washed in deionized water to remove any salts, and subsequently wet-sieved through a 63-µm sieve. The sand and gravel fractions (>63 µm and >2 mm, respectively) were separated and the

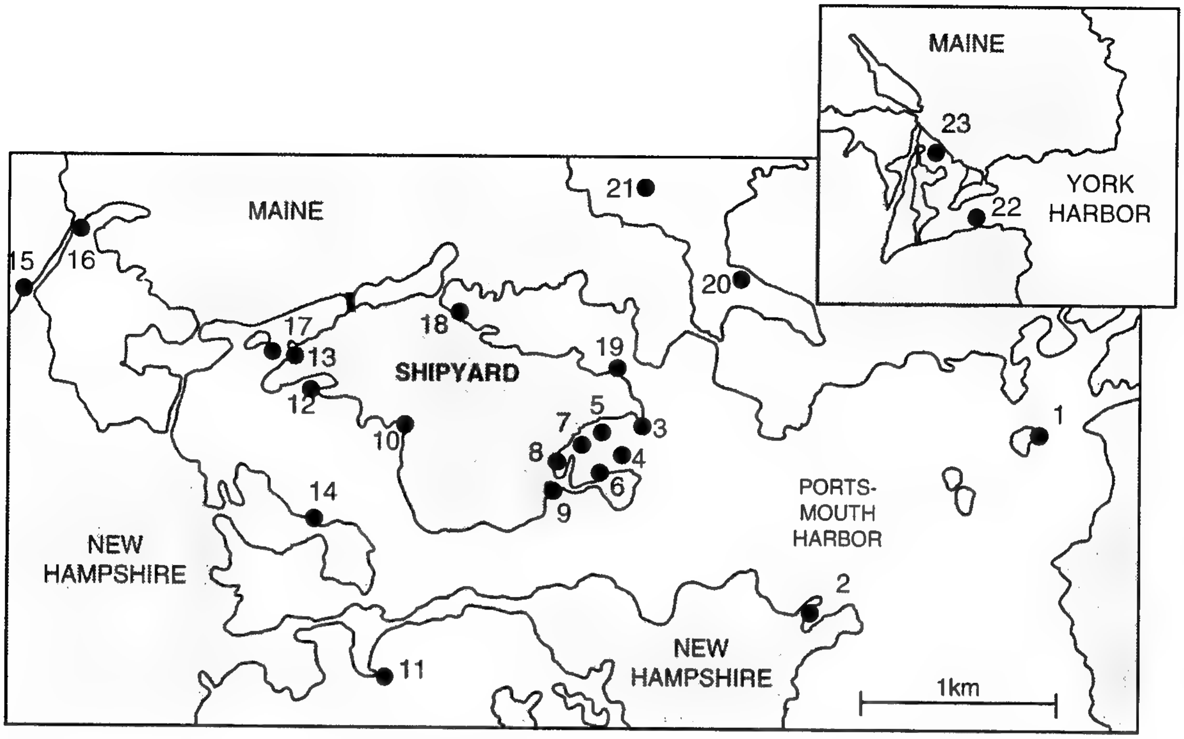


Figure 3-1. Location map of sampling stations.

grain size distributions determined by sieve analysis (if the dry weight of the sand and gravel was greater than 5% of the total sample weight) (Folk, 1980). The mud fraction (<63 µm) was determined by complete pipette analysis if the dry weight was greater than 5% of the total. The size measurements were converted into Φ units by $\Phi = \log_2 d_{mn}$, where d_{mn} is the diameter of the particle in millimeters. The results of the two analyses were merged to determine the grain size statistics (% gravel, sand, silt, or clay and mean size, sorting, skewness, and kurtosis) of the entire sample. The methodologies are described in detail in UNH-JEL SOP 1.11 (Mueller et al., 1992). Total organic carbon (TOC) and loss on ignition content were determined for 43 samples that were representative of the sediment types. A least-squares regression was performed to determine the relationship between percent loss on ignition and percent TOC, determined by chromatography with a Carlo Erba Nitrogen Analyzer (UNH JEL SOP 1.11, Rev 1, in NCCOSC et al., 1994).

Sediment coring was attempted at each station and was successfully completed at 19 sites utilizing a Benthos gravity corer. Sediment cores ranged in length from 17 to 147 cm. These samples were photographed, described, and subsampled for textural (described above), chemical, and microbiological analyses. A total of 57 samples (75–150 grams wet weight) were taken and archived for textural analyses and 138 samples were taken and analyzed for moisture and loss on ignition.

RESULTS

Results of the textural analysis for Stations 1–23 show that the sediments range from extremely poorly sorted muddy, sandy gravels to extremely poorly sorted mud. Mean grain sizes range from -0.40 Φ from Station 18 in the Back Channel to 8.4 Φ from Station 4 in Clark Cove (see Appendix A and figures 3-2 and 3-3). Sorting values range from 0.3 Φ (very well sorted) at Station 23 to 4.6 Φ (extremely poorly sorted) (figure 3-3) at Station 18.

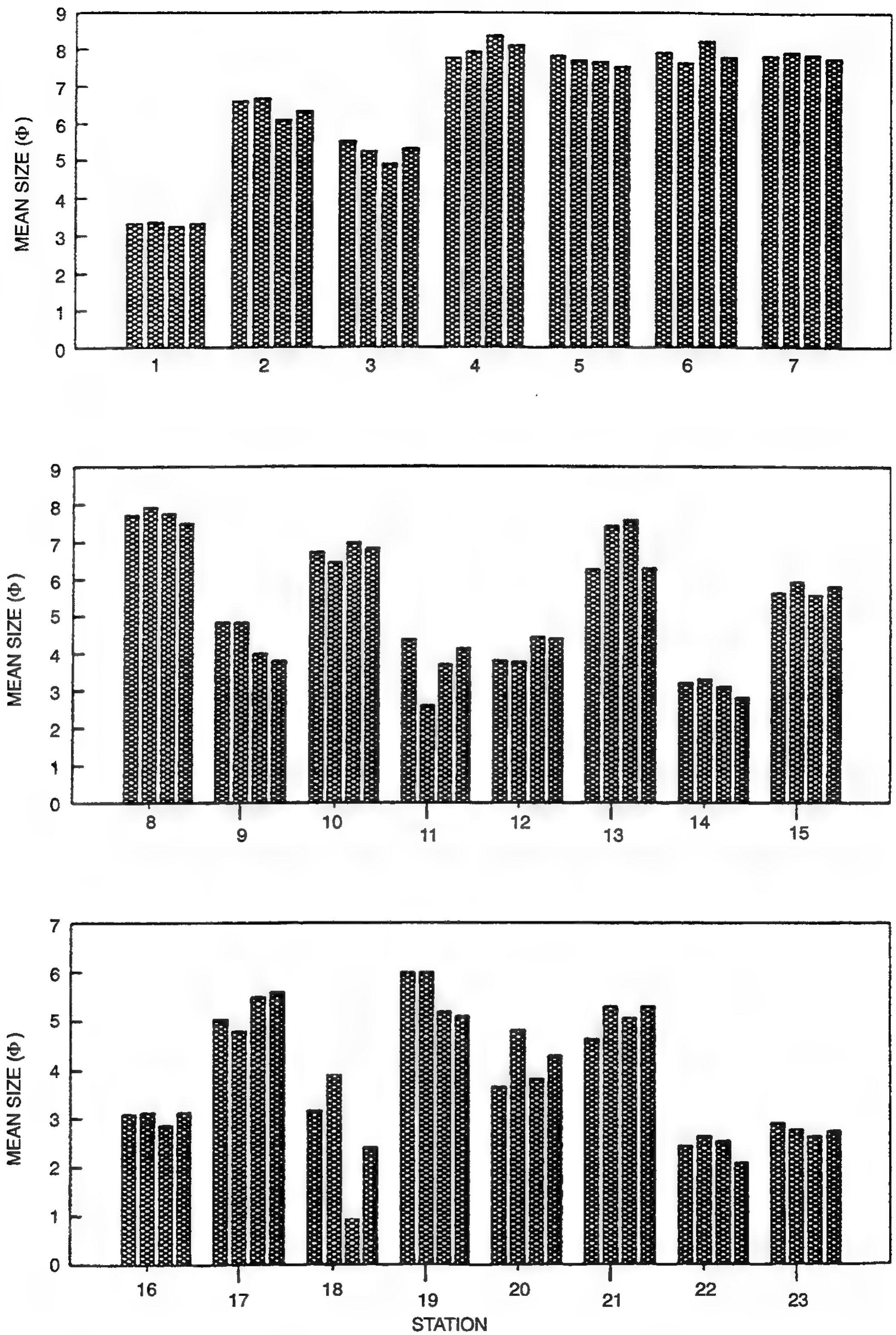
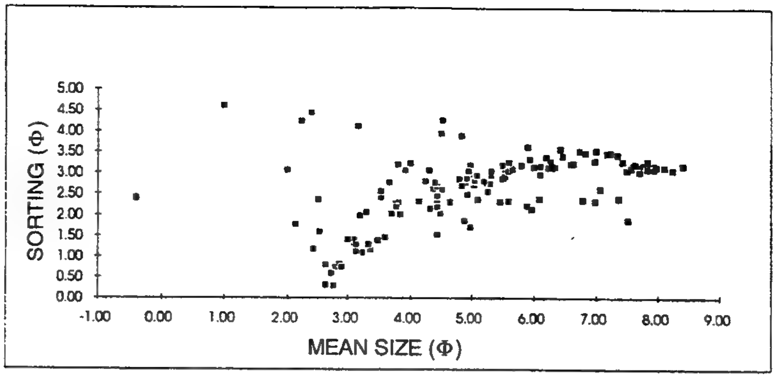


Figure 3-2. Mean size for each of four replicates from each station.



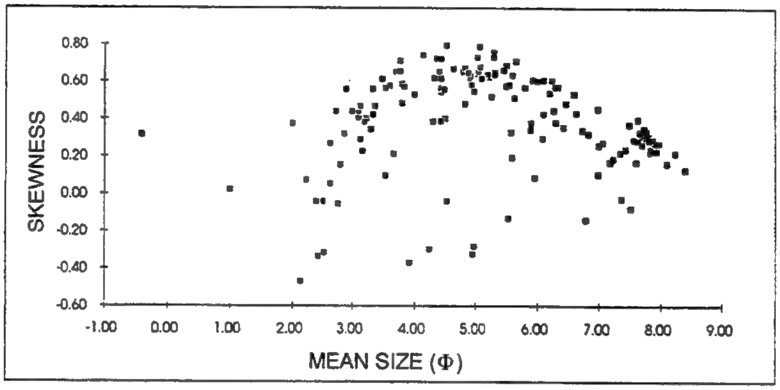


Figure 3-3. Mean size versus sorting (upper graph) and skewness (lower graph) for grab and core samples from Stations 1–23.

Most of the samples are positively skewed (figure 3-3). The majority of the samples were muddy sand to sandy mud, with the main exceptions being the very extremely poorly sorted mud in Clark Cove and the very well to moderately sorted sand at the York River stations. An examination of the replicates of the textural analyses for each station indicated that the variability within a station was usually small for fine-grained sediments, with more variability for coarser-grained sediments (figure 3-2). The loss on ignition contents ranged from 1 percent to 13 percent, while the moisture contents varied from 18 percent to 77 percent; both varied directly with mean grain size, with the finest sized sediments having the highest moisture and combustibles contents (figure 3-4). Regression analysis showed that

$$\% \text{ TOC} = 0.269 \text{ (\% Loss on Ignition)}$$

with $r^2 = 0.797$ (figure 3-5). The regression demonstrated that % loss on ignition can be used to predict the % TOC of sediments sampled in the lower estuary.

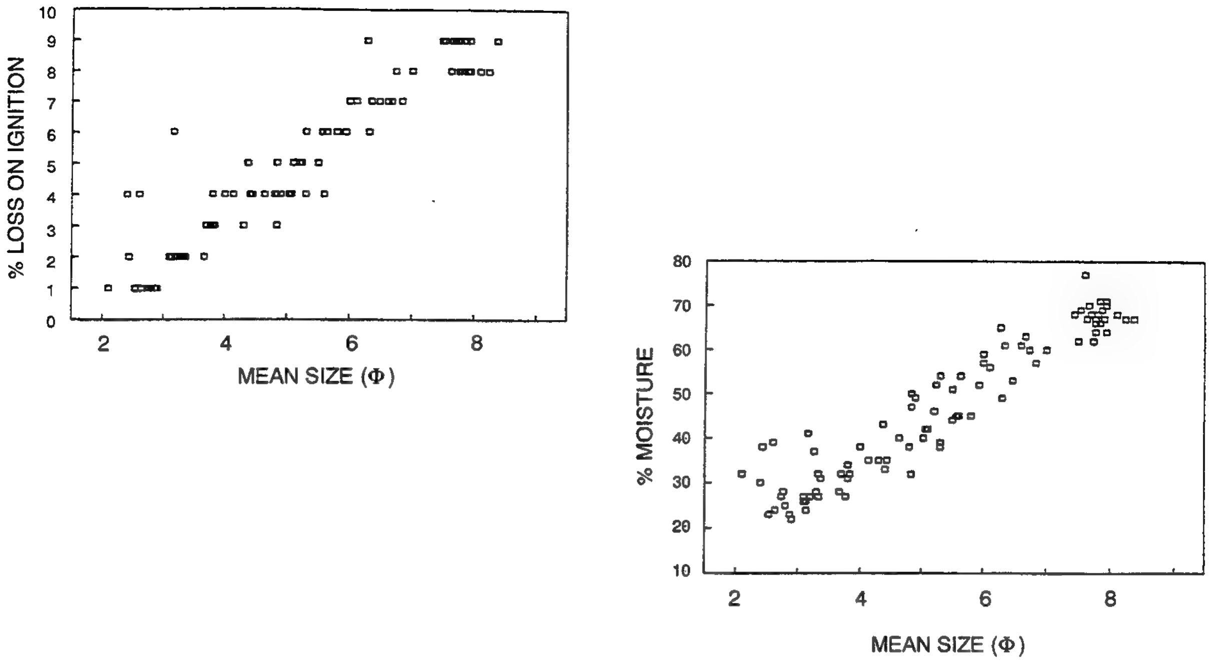


Figure 3-4. Mean size versus loss on ignition content (upper graph) and moisture content (lower graph) for all samples from Stations 1–23.

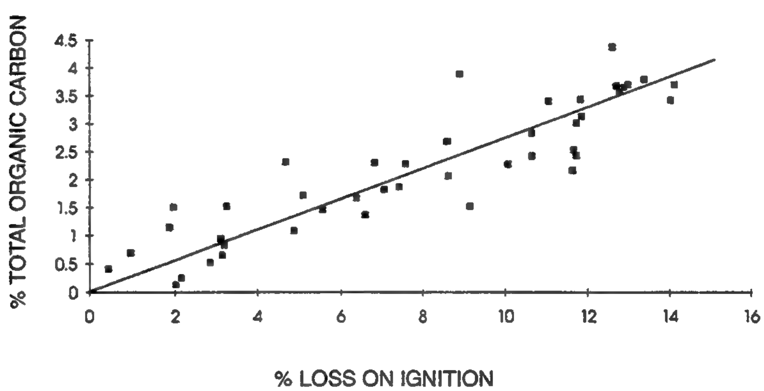


Figure 3-5. Regression analysis from grab and core samples from Stations 1–23.

DISCUSSION

Textural analyses of the samples from Stations 1 to 23 were completed with no major difficulties encountered. The sediments sampled are typical of estuarine systems located in previously glaciated regions. Initial results show that the stations sampled in Phase I are representative of the major depositional environments in the lower Piscataqua Estuary. In Phase II of this project, textural data will be incorporated into a surficial sediment distribution map and sedimentation processes in the lower estuary will be assessed (NCCOSC et al., 1994).

3.2 SEDIMENT TOXICITY

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ABSTRACT

Sediment toxicity was determined using the 10-day amphipod solid-phase test to provide an acute mortality endpoint for an invertebrate (*Ampelisca abdita*) indigenous to the Great Bay Estuary. By characterizing the current toxicity of sediments to a representative benthic organism, the results of this bioassay define a potential for ecological risk. Sediments collected from 23 stations in the Piscataqua Estuary in and around the Shipyard were evaluated. Statistically significant reductions in survival were noted at seven stations. Relationships with sediment grain size, total organic carbon (TOC) content, and benthic composition were evaluated. Contaminant values at toxic stations were examined and compared to published effects threshold values. These results indicate that the 10-day amphipod test is a reasonably accurate predictor of benthic impacts in the field. Sandy sediments, moderate to extremely low TOC values, and values that exceed the threshold values of several inorganic and organic compounds are likely indications for the reduced survival observed in the *Ampelisca* test at all but one of these stations.

INTRODUCTION

Generally, contaminants which enter estuaries from various land-based and atmospheric sources have an affinity for fine particles such as sediments, enabling pollutants to accumulate in bottom sediments which serve as depositional sinks (Hinga, 1988). Metal and organic chemical contamination can be so severe in these bottom sediments that human and ecological health may be threatened (NRC, 1989). Laboratory toxicity tests have gained wide acceptance and have become an essential component of programs, such as risk assessments, interested in establishing relationships between chemical contamination and ecological effects (Swartz, 1987). Not only can toxicity testing determine the pollutant-induced biological effects of contaminated sediments, but it can enhance chemical analyses which are unable to address issues of bioavailability due to chemical-to-chemical interactions and to the absorption affinities between particles (USEPA, 1989).

In this study, composite sediment samples from 23 stations (Section 2.0) were evaluated for toxicity using the 10-day amphipod solid-phase test described in the ERLN SOP 1.03.002 (Mueller et al., 1992). This bioassay has been used extensively to assess the toxicity of laboratory-spiked and field-collected sediments to *Ampelisca abdita* (DiToro et al., 1992; Scott and Redmond, 1989; Long et al., 1990). *Ampelisca abdita* is a euryhaline benthic amphipod which ranges from Newfoundland to Florida and the Gulf of Mexico. This tube-dwelling amphipod constructs a soft, upright, membranous tube 3 to 4 cm long in fine sediments from the intertidal zone to a depth of 60 meters. *Ampelisca* ingest either surface-deposited particles or particles in suspension and respire in both overlying and interstitial waters.

METHODS

A toxicological evaluation of surficial sediments from 23 stations in the Great Bay Estuary was conducted according to the methods described below. *Ampelisca abdita* were collected

locally from tidal flats located in a small estuary near Narragansett Bay, RI. Surface sediments (8 to 10 cm) containing amphipods were sieved through a 0.5-mm-mesh stainless steel screen. Amphipods were collected from the air–water interface with a dip net and were transported to the laboratory in buckets where they were held until testing under static conditions in central Long Island Sound (LIS) sediment and seawater. During this holding period (<7 days), *Ampelisca* were fed the laboratory-cultured diatom *Phaeodactylum tricornutum*, and at least 50% of the seawater was replaced daily.

Test sediments were press-sieved and homogenized to remove debris and large indigenous animals by pushing approximately 1 gallon of sediment through a 2.0-mm-mesh stainless steel screen with a plexiglass paddle. Sediments containing amphipods were pushed through a 1.0-mm-mesh stainless steel screen to remove resident *Ampelisca abdita* and other organisms. Prepared sediments (200 ml) were added to exposure chambers (1-liter glass canning jars) which were filled with 600-ml filtered seawater obtained from lower Narragansett Bay. A plastic disk fixed to a long polystyrene pipette with silicone glue (turbulence reducer) was used to add the seawater to avoid disturbing the sediment at the bottom of each chamber. The chambers were capped with inverted glass dishes, and air was delivered from pumps through plastic tubing to 1-ml pipettes inserted in small openings drilled through the bottom of the inverted glass dish.

Performance control sediments were collected from the US Army Corps of Engineers (New England Division) central LIS reference station. The sediments from this location are fine-grained (>90% silt/clay) and have an organic carbon content of approximately 2%. An extensive database at ERLN and SAIC's Environmental Testing Center has demonstrated the nontoxic nature of the sediment to *Ampelisca* during the 10-day sediment test (SAIC, 1992a, 1992b, and 1992c).

Testing began after amphipods were sieved from holding containers, randomly selected, and added to each exposure chamber (20 per chamber). Five replicates per station were tested at 20°C with 24 hours of constant light at 28 to 30 ppt salinity for 10 days. Each replicate was examined daily. Emerged animals were recorded as live, dead, or moribund. Temperature was monitored daily; water quality parameters (pH, dissolved oxygen, and salinity) were measured twice during the test.

After 10 days, the contents of each exposure chamber were sieved through a 0.5-mm-mesh screen. Retained material was sorted microscopically, and recovered animals were counted. Any amphipods unaccounted for were assumed to have died and decomposed and were so recorded. Statistical differences between the number alive at each station and the number alive in the performance control were detected by conducting a one-way unpaired t-test (alpha ≤ 0.05).

A 96-hour water-only test, with a 48-hour renewal, was conducted with the reference toxicant sodium dodecyl sulfate (SDS) to determine the sensitivity of test animals. Results (trimmed Spearman-Karber LC_{50}) were compared with control charts to ensure that they were within the acceptable limits. Consistency between reference toxicant tests was used as a measure of laboratory performance (USEPA, 1979). Four concentrations (1, 3, 7, and 10 ppm) with two replicates each were tested at 20°C with 24 hours of constant dark. Each replicate was examined daily. Live, dead, or moribund organisms were recorded. Temperature was monitored daily; water quality parameters (pH, dissolved oxygen, and salinity) were measured twice during the test.

To evaluate sediment effects, survival in the *Ampelisca* test was correlated with mean grain size (percent silt/clay) and mean TOC content of four replicates at each station measured

according to the procedures discussed in Section 3.1. Silt and clay fractions were combined to calculate the percent silt/clay. TOC was computed by multiplying the percent combustibles by 0.269 (see Section 3.1).

Chemical concentration levels (Section 3.13) at toxic Piscataqua River and York River stations with <80% survival were compared with Long and Morgan effects range-low (ER-L) threshold values listed in table 3-1, with NOAA Status and Trends (NS&T) "high" values (NS&T-High) listed in table 1, and with EPA sediment quality criteria (SQC) final chronic values (FCVs) (Long and Morgan, 1990; O'Connor, 1990; USEPA, 1993a; USEPA, 1993b).

Table 3-1. Chemical threshold values.

Contaminant	ER-L	NS&T-High
Metals (μg/g)		
Cadmium	—	1.3
Chromium	—	230
Copper	—	87
Lead	35	87
Organics (ng/g)		
Anthracene	85	—
Benz(a)anthracene	230	—
Benzo(a)pyrene	400	—
Chrysene	400	—
Dibenz(a,h)anthracene	60	—
Fluoranthene	600	—
Fluorene	35	—
Penanthrene	225	—
Pyrene	350	—
Total PAH	4000	3900

The ER-Ls are biological effects-based contaminant levels (representing the lower 10 percentile) that are determined by the observed or predicted values associated with biological effects. The thresholds are based on the equilibrium-partitioning approach, the spiked-sediment bioassay approach, and several synoptic evaluations of chemical and biological data. The NS&T-High levels are statistically derived values defined as those values that lie one standard deviation above the mean of the lognormal distribution for all concentrations (68th percentile).

The raw data were compared with NS&T-High levels by normalizing the chemical concentration to the percentage of silt plus clay in the sample

$$NST = CONC/fine$$

where

NST	=	chemical concentration per unit fine material
CONC	=	chemical concentration measured in the sample
fine	=	percent silt plus clay measured in the sample

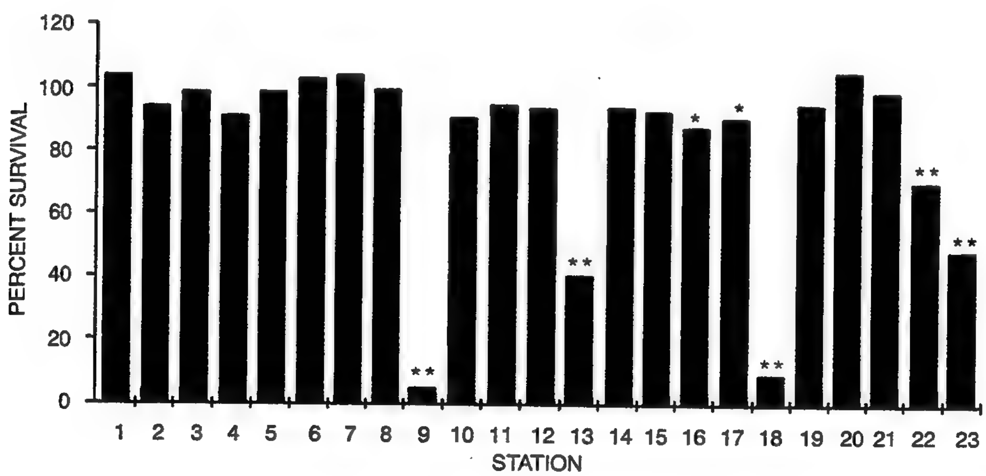
EPA's SQC FCVs were computed using the water quality criteria (WQC) FCV and the partition coefficient between sediment and pore water. The WQC FCVs are the values which

should protect 95% of the species tested from chronic effects. The FCV is a quotient of the final acute value (FAV) and the final acute chronic ratio (ACR) described in the National Water Quality Criteria Guidelines (Stephan et al., 1985).

Results of the 10-day test were also compared with the benthic infaunal assessments described in Section 3.12. Survival was compared with the mean densities of *Ampelisca abdita*, with all ampeliscids, and with all benthic organisms at each station.

RESULTS AND DISCUSSION

Summarized results of toxicological testing conducted to determine the effects of sediments from 23 stations in the Great Bay Estuary are presented in figure 3-6. Raw data are listed in Appendix B. LC_{50}'s calculated from the reference toxicant tests were within normal limits, as were the water quality parameters measured during the 10-day test and the reference toxicant test. Sediment samples from seven stations (Stations 9, 13, 16, 17, 18, 22, and 23) displayed significantly ($P \leq 0.05$) lower survivorship than the performance control sediment. Stations 9, 13, and 18 are immediately adjacent to Seavey Island; Station 16 is on the north side of the river near the Route 95 bridge and the Kittery sewage outfall; Station 17 is next to Badgers Island; and Stations 22 and 23 are in the York River (see Section 2.0). Survivorship measured at Stations 16 and 17 was 85 and 88%, respectively, while survivorship at Stations 9, 13, 18, 22, and 23 ranged from 5 to about 80%. Survivorship below 80% is considered to be toxicologically meaningful, and potentially able to cause population impacts (Glen Thursby, SAIC, personal communication; Munns et al., 1993a).

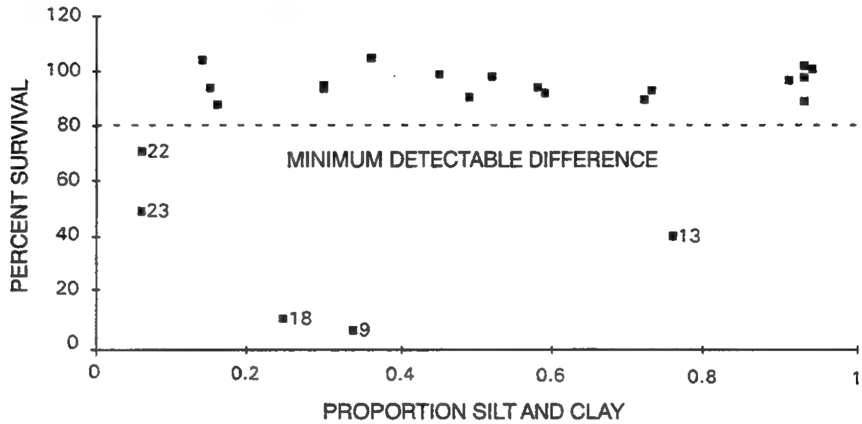


*Statistically different from the performance control.
**Statistically different from the performance control and below the minimum detectable difference.

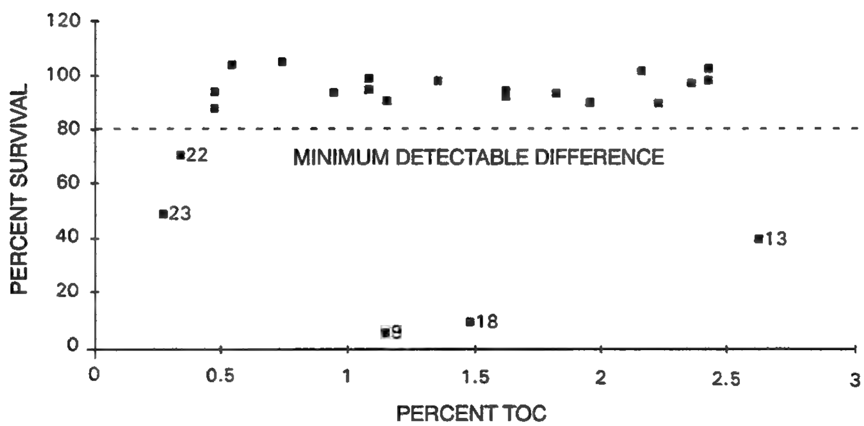
Figure 3-6. The percent survival in the 10-day solid-phase *Ampelisca abdita* test at each station.

The relationships between percent silt and clay at each station and survival in the 10-day amphipod test are presented in figure 3-7a. While reduced survival at Stations 22 and 23 may be associated with the high percentage of sand (>90%), historical data from testing conducted at SAIC's Environmental Testing Center with sediments containing up to 86% sand indicate no clear correlation between toxic responses and sediment grain size (SAIC, 1992a, 1992b, 1992c, and 1993).

The correlation between TOC and survival is presented in figure 3-7b. Again, while reduced survival at Stations 22 and 23 may be associated with low levels of TOC (<0.5%) in the sediments from these stations, past assessments at SAIC's Environmental Testing Center have been unable to associate toxic effects to *Ampelisca* with organic carbon content in the sediment (K. J. Scott, SAIC, personal communication). TOC does, however, affect the bioavailability of some contaminants to biota by serving as the predominant sorption phase for nonionoic organics. While the levels of many of these chemicals at Stations 22 and 23 were below the method detection limit or the limit of quantification (see Section 3.13), they may have been more bioavailable to elicit toxic effects because of low TOC levels.



(a) Fine particulates.



(b) Total organic carbon.

Figure 3-7. Survival in the 10-day solid-phase *Ampelisca abdita* test as a function of textural characteristics.

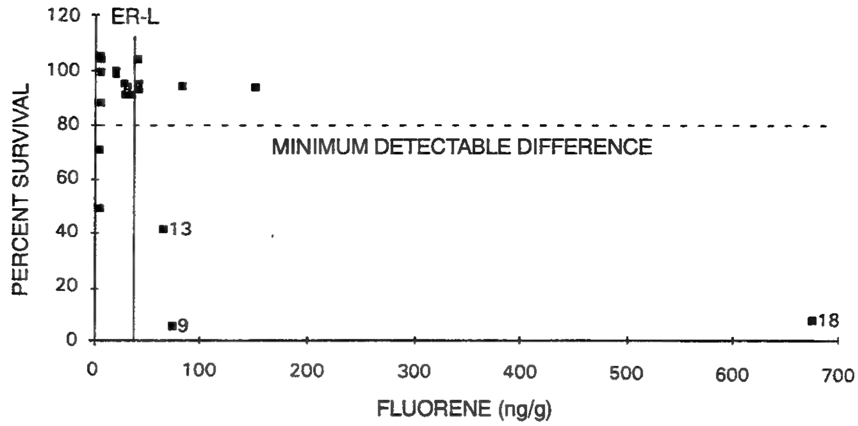
Several contaminants exceeded ER–L levels and NS&T–High values at stations with reduced *Ampelisca* survivorship. No SQC FCVs were exceeded at any station. Levels of fluorene, phenanthrene, anthracene, pyrene, benz(a)anthracene, the sum of measured PAHs (SUMPAHs), and lead exceeded ER-L levels at Stations 9, 13, and 18 (figures 3-8a–3-8g). Benzo(a)pyrene levels at Stations 9 and 18 exceeded ER-L values (figure 3-8h), as did chrysene and fluoranthene levels at Stations 13 and 18 (figures 3-8i and 3-8j) and dibenz(a,h)anthracene levels at Station 18 (figure 3-8k). When several chemicals were normalized per unit fine grain material, they

exceeded the NS&T-High levels at stations where toxicity was observed: lead (Pb) at Stations 9, 18, 22, and 23 (figure 3-9a); SUMPAH at Stations 9, 13, and 18 (figure 3-9b); chromium (Cr) at Stations 22 and 23 (figure 3-9c); and cadmium (Cd) (figure 3-9d) and copper (Cu) (figure 3-9e) at Station 18.

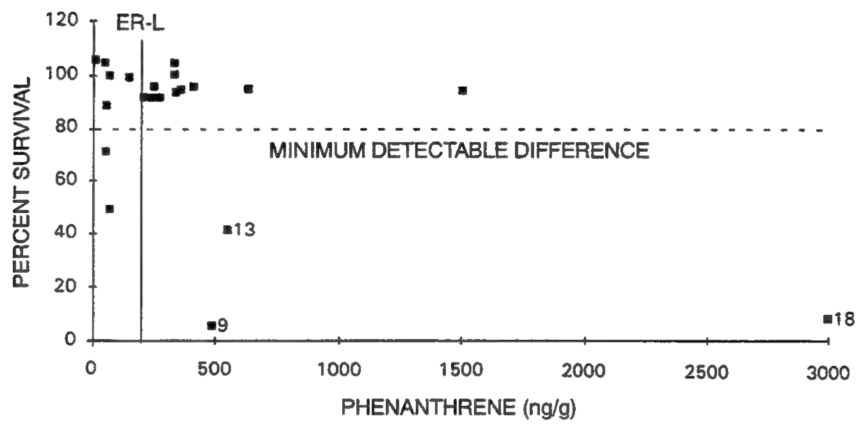
Relationships between the benthic infaunal assessments and survival in the 10-day test are presented in figures 3-10a–3-10c. Results indicate a relationship between laboratory test survival and densities of benthic infauna in the field. While low densities of benthic organisms were associated with high survival in the laboratory test at several stations (attributable to a variety of ecological parameters, such as predation, competition, and availability of resources), low test survival was never associated with high field densities. Where survivorship was less than 80%, field densities of *Ampelisca abdita* were <1000 organisms/m^2/station, field densities of ampeliscids were <1000 animals/m^2/station, and densities of all benthic organisms were <40000/m^2/station. These results indicate that the laboratory 10-day amphipod test is a reasonably accurate predictor of benthic impacts in the field.

Toxicological responses measured in samples from Stations 22 and 23 were associated with sandy sediments, extremely low TOC values, and elevated levels (per unit fine material) of Pb and Cr (figures 3-9a and 3-9c). Toxicity at Station 9 was associated with elevated levels (per unit fine material) of Pb and SUMPAH (figures 3-9a and 3-9b). Toxicity at Station 13 was associated with elevated levels of PAH (per unit fine material) (figures 3-9b). Elevated levels (per unit fine material) of Pb, SUMPAH, Cd, and Cu were also associated with the toxicity observed at Station 18 (figure 3-9).

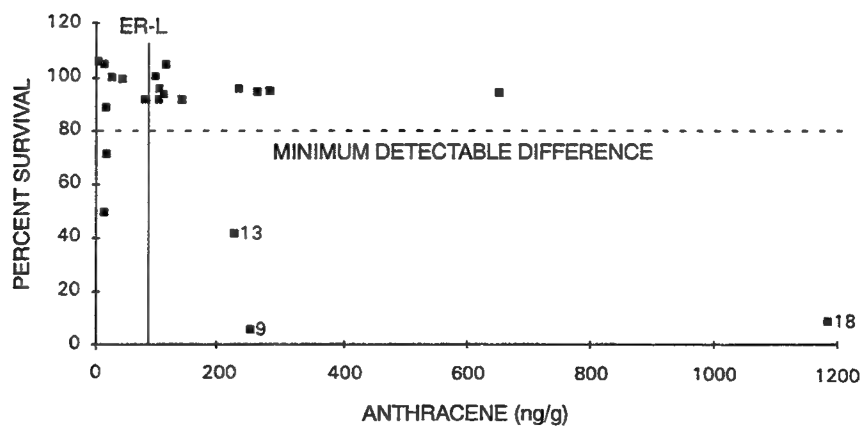
The relationship between chemical exposure and toxicity observed at Station 13 is inconclusive because only moderate increases of chemicals over threshold levels were observed at Station 13 and TOC values were higher than values observed at stations with no toxic responses.



(a) Fluorene.



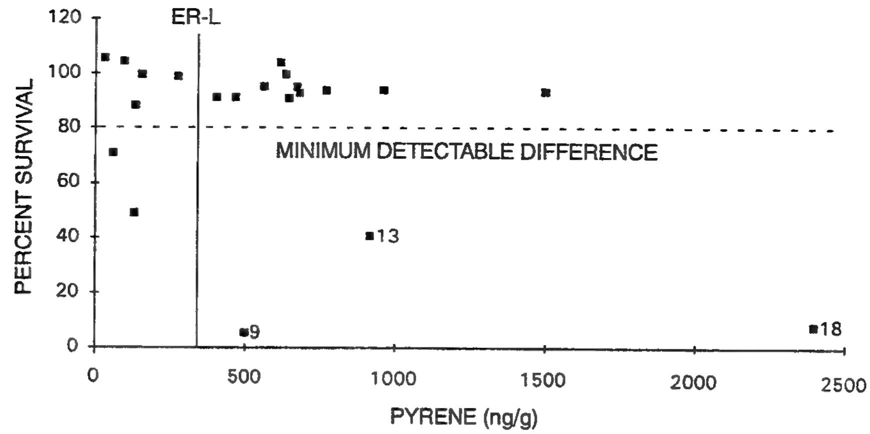
(b) Phenanthrene.



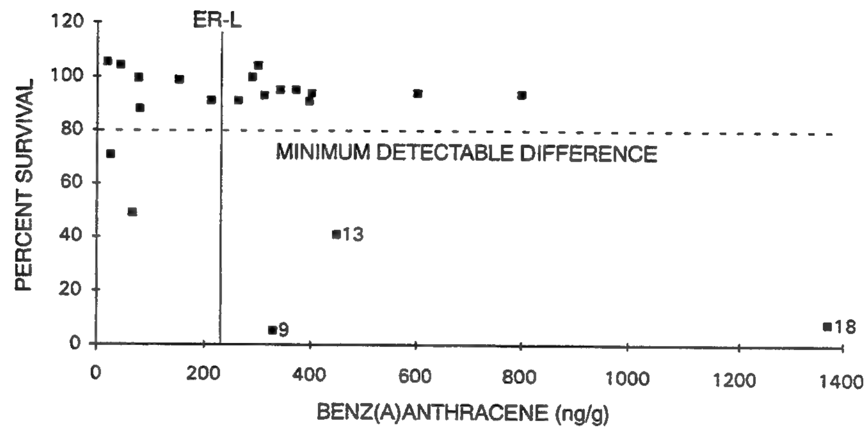
(c) Anthracene.

Figure 3-8. Survival in the 10-day solid-phase *Ampelisca abdita* test as a function of chemical concentration levels.

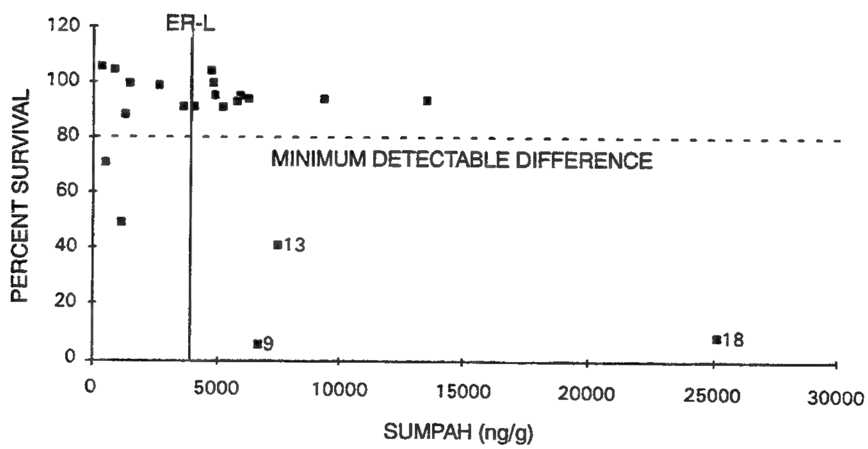
(Contd)



(d) Pyrene.



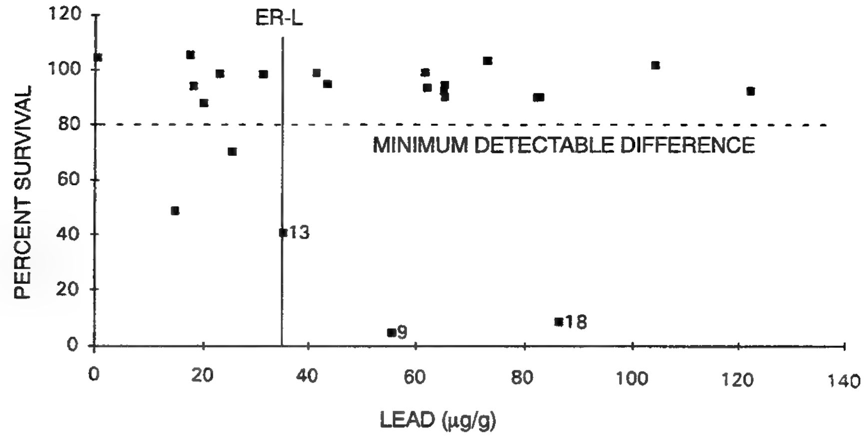
(e) Benz(a)anthracene.



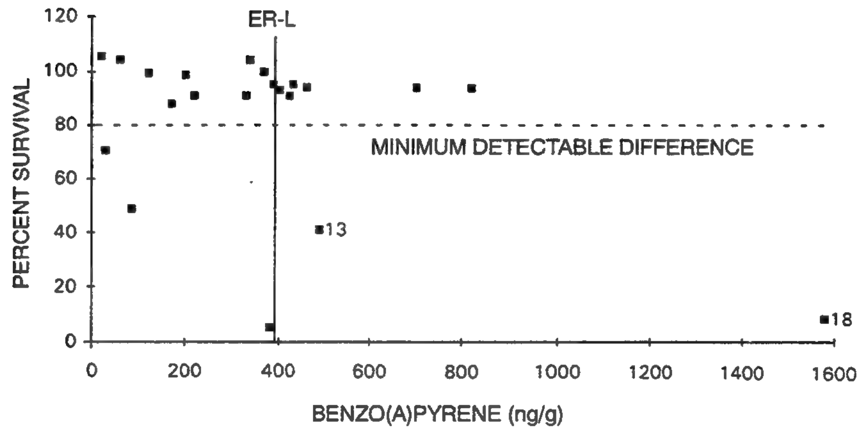
(f) SUMPAH.

Figure 3-8. Continued.

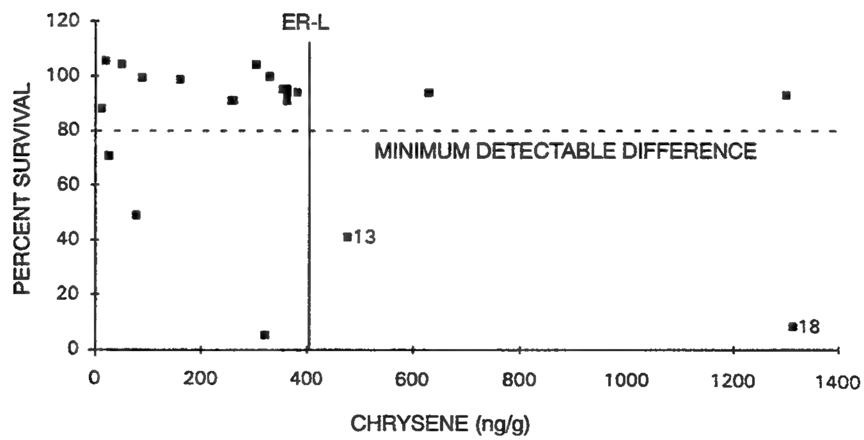
(Contd)



(g) Lead.



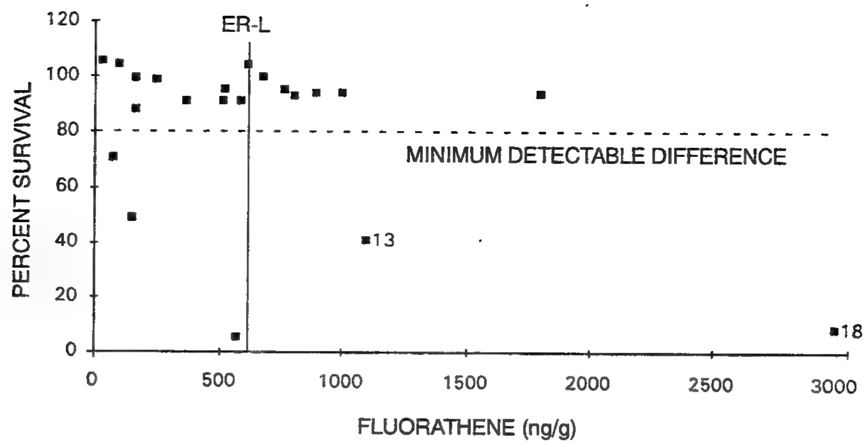
(h) Benzo(a)pyrene.



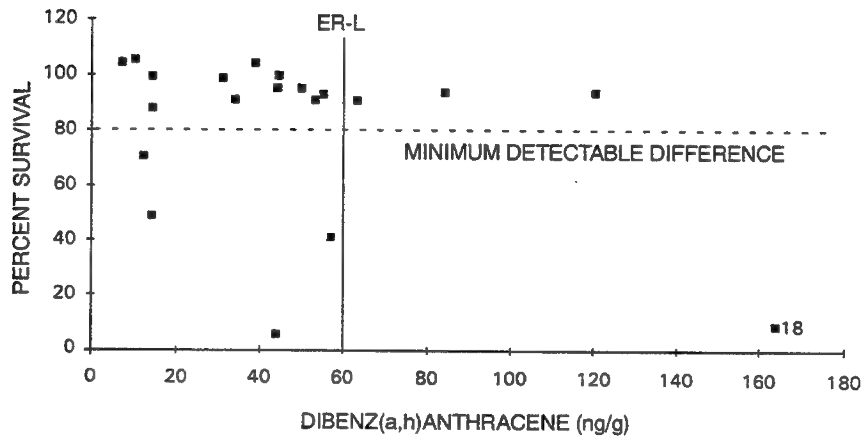
(i) Chrysene.

Figure 3-8. Continued.

(Contd)

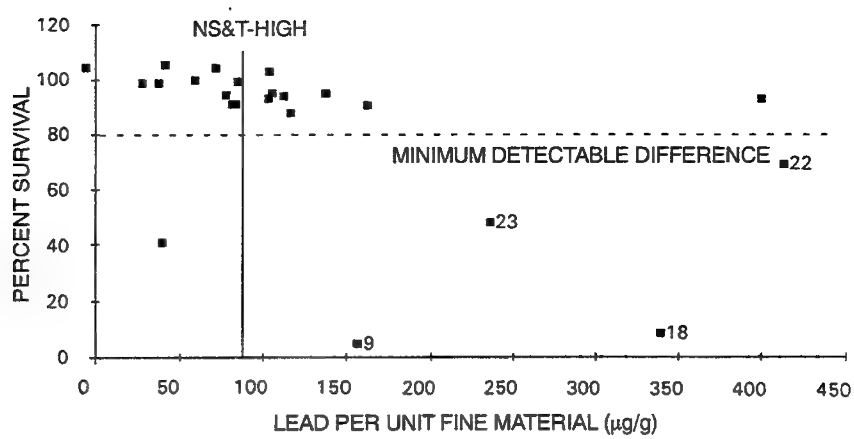


(j) Fluoranthene.

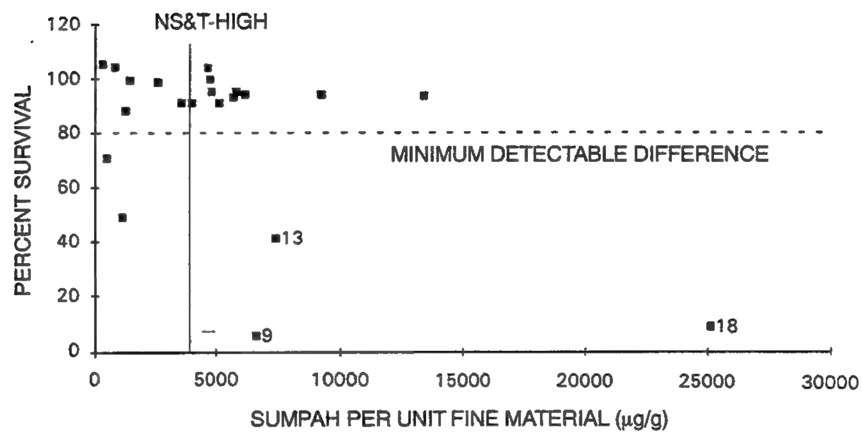


(k) Dibenz(a,h)anthracene.

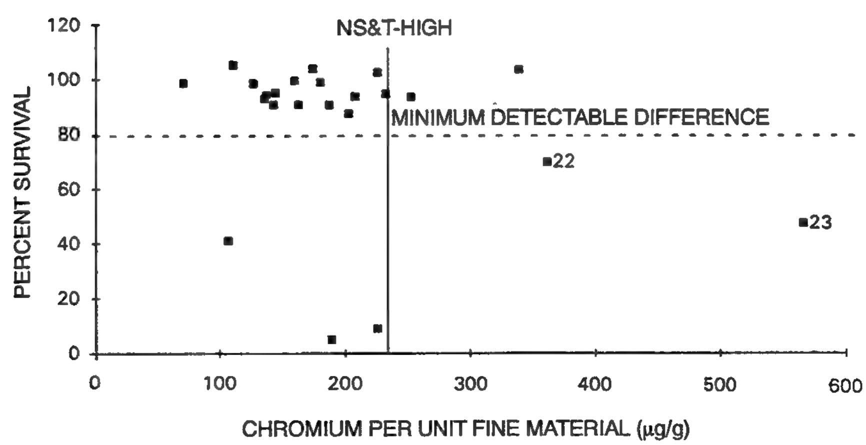
Figure 3-8. Continued.



(a) Lead



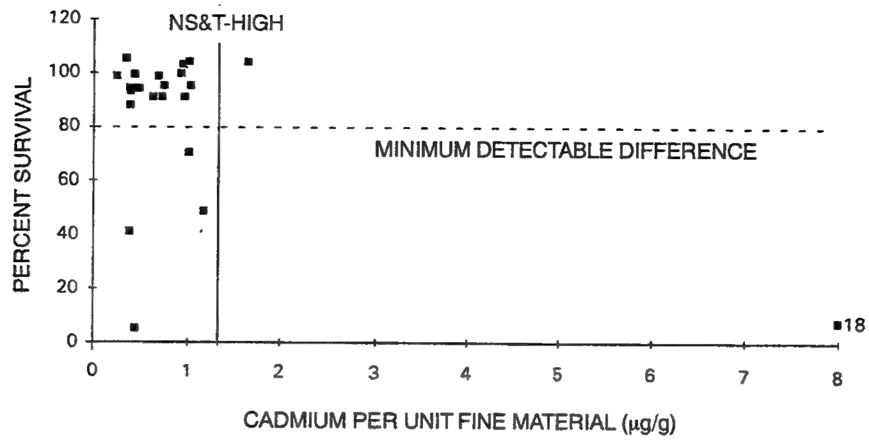
(b) SUMPAH.



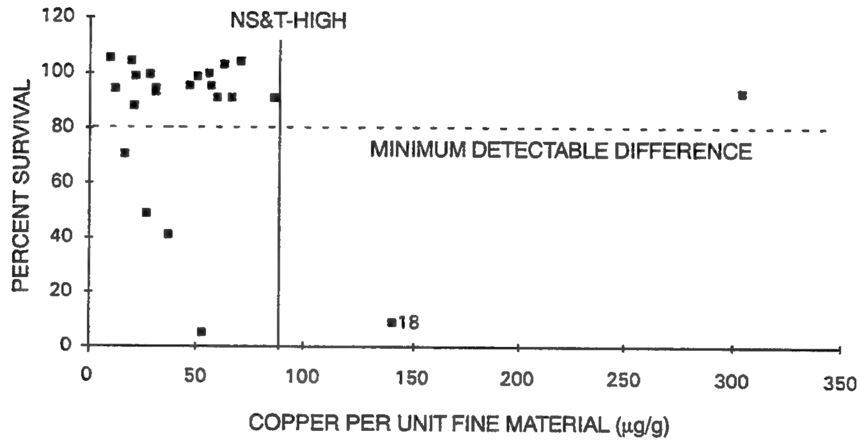
(c) Chromium.

Figure 3-9. Survival in the 10-day solid-phase *Ampelisca abdita* test as a function of chemical concentration per unit of fine-grained sediment.

(Contd)

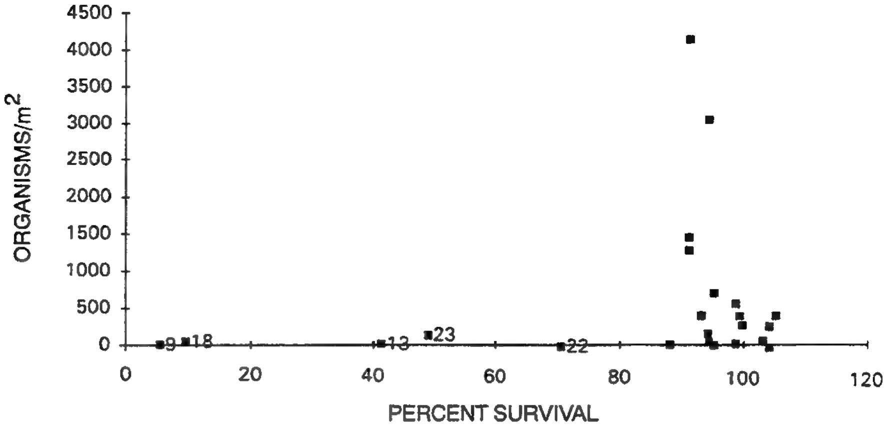


(d) Cadmium.

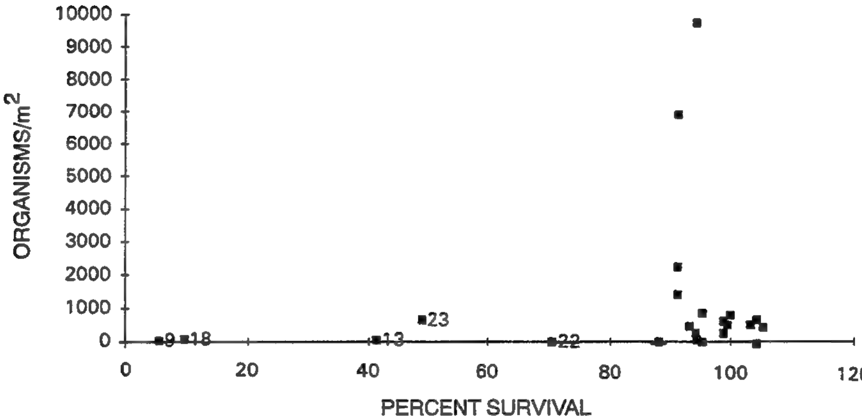


(e) Copper.

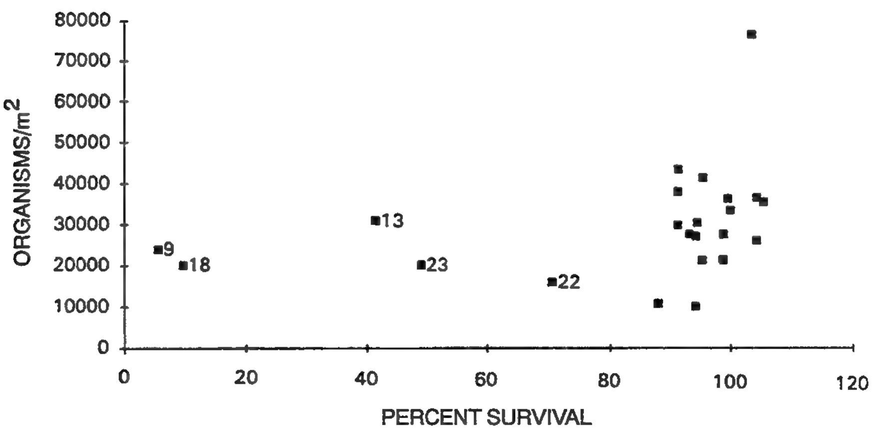
Figure 3-9. Continued.



(a) *Ampelisca abdita*/m^2.



(b) *Ampeliscids*/m^2.



(c) Benthic organisms/m^2.

Figure 3-10. Density as a function of percent survival in the 10-day solid-phase test.

3.3 CHARACTERIZATION OF WATER-COLUMN CONDITIONS

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ABSTRACT

Water-column samples were obtained from 21 sites in Portsmouth Harbor, NH, and two reference sites in York Harbor, ME, in September 1991. Four of the stations in Portsmouth and one in York were sampled monthly from November 1991 through June 1992. A fifth Portsmouth Harbor station was added in January 1992 and sampled monthly through June 1992. September 1991 to June 1992 was the first phase of an ecological risk assessment study for the Portsmouth Naval Shipyard (PNSY). Replicate subsurface grab samples were analyzed for pH, total suspended solids, percent organic content on combustion, chlorophyll *a*, phaeoigments, nitrate, orthophosphate, and ammonium. Additional water samples were obtained for microbial analysis, toxicological studies, and metal analysis. The initial sampling in September included measurements of the physical parameters of temperature, salinity, and dissolved oxygen at 1-meter intervals from 1 meter below the surface to the bottom. Subsequent monthly sampling included the same measurements 1 meter below the surface only. Vertical profiles of the physical parameters of the water column obtained in September 1991 showed very little variation from surface to bottom, indicating that the water column is vertically well mixed. With the exception of very low levels of nitrate at the York Harbor station, September concentrations of suspended solids, photosynthetic pigments, and nutrients were similar to those obtained in the upper estuary during the same season. These same parameters observed monthly at six stations showed similar seasonal patterns between stations as well as, with some exceptions, to other stations in the upper estuary. Though the seasonal patterns were similar for most parameters, differences were noted between mean concentrations of chloropyll and total suspended solids, both of which were higher in the upper estuary, and for total nitrogen, which was higher in the lower estuary. Between-station comparisons indicated that mean nitrate concentration was significantly higher at Station 15 (ANOVA $p<.05$).

INTRODUCTION

Past waste disposal practices at the Portsmouth Naval Shipyard in Kittery, ME, pose risks to the marine environment. The offshore portion of this study involves the efforts of NRaD in San Diego, Jackson Estuarine Laboratory and the Department of Mechanical Engineering at UNH, and the EPA Environmental Research Laboratory, Narragansett, and is aimed at developing a generic approach to determining risk to the marine environment from land-based hazardous waste sites. This subsection describes the characterization of water-column conditions, an aspect of Phase I data-gathering for the risk assessment study.

METHODS

The initial round of water-column samples was obtained from 21 sites in Portsmouth Harbor, NH, on 16 and 17 September 1991, and from two reference sites in York Harbor, ME, on 13 September 1991 (see figure 2-7). Beginning in November 1991, Stations 1, 8, 10, 15, and 23 were sampled monthly. In January 1992, Station 16 was added to the monthly sampling, to correspond to the quarterly mussel sampling and to monitor the water quality associated with the flow regime on the main side of the river. Replicate subsurface ($\approx$0.5 meter below the water surface) grab samples were taken using 1-liter, acid-cleaned polyethylene bottles. Additional samples were obtained for microbial analyses in 1-liter, sterilized polyethylene bottles; for metal analyses in 500-ml polyethylene containers; and for toxicological studies in 125-ml glass bottles. Sample containers for metals and toxicology were specially prepared to meet EPA standards for these analyses. Sampling was conducted as close to low tide as was possible for continuity. Sampling methodology followed UNH-JEL SOP 1.05 for water sampling (Langan, 1992a). Water-column measurements of temperature, salinity, and dissolved oxygen were obtained in conjunction with the water samples following UNH-JEL SOP 1.05. During monthly sampling, measurements were obtained at 1 meter below the surface only.

Samples were kept in the dark on ice and filtered within 1 hour of collection following UNH-JEL SOP 1.06 (Langan, 1992b). Metal samples were treated immediately with 0.5 ml of concentrated nitric acid following ERLN SOP 2.03.008 (Mueller et al., 1992). Metal and toxicological samples were kept on ice in the dark and either picked up within 24 hours or shipped overnight mail to the Ceimic Corp., Narragansett, RI. Replicate samples were processed and analyzed for total suspended solids, percent organic content on combustion, chlorophyll *a*, and phaeopigment following NH-JEL SOP 1.06 (Langan, 1992b). Filtrate from each sample was split into three equal portions for nutrient analysis. September samples were analyzed for NH_4^+ following UNH-JEL SOP 1.07 (Wolf and Langan, 1992a), PO_4^{-3} following UNH-JEL SOP 1.08 (Wolf and Langan, 1992b), and NO_3^- using standard methods for a TECHNICON A.A. (Loder and Gilbert, 1977). Ammonium and nitrate concentrations in monthly samples were analyzed on a LACHAT QUIK-CHEM nutrient autoanalyzer using methods #11-107-06-1-C and #30107-04-1-A, respectively (Lachat Instruments, 1991). Monthly phosphate analyses employed the same method as the September samples. Field and laboratory data were recorded by hand, then transferred and stored on computer disk using EXCEL for the MacIntosh. Results were prepared in graphic form using CRICKET GRAPH and DELTAGRAPH software for the MacIntosh. Basic statistics were calculated using STATWORKS and analysis of variance using SUPER ANOVA software.

RESULTS

Results of water-column sampling are included in Appendix C. Data obtained from toxicological, microbial, and metal analysis are presented in Sections 3.4, 3.5, and 3.13, respectively. Data for temperature, salinity, and dissolved oxygen corresponding to water samples are from a depth of 1 meter below the surface. Vertical profiles for temperature, salinity, and dissolved oxygen for all stations with water depth >2 meters at sampling time are presented in figures 3-11 to 3-13. These profiles show very little variation throughout the water column and indicate vertical mixing at all stations. Mean values for water sample analyses and physical parameter measurements at a 1-meter depth for the September 1991 sampling are presented in figures 3-14 to 3-19. The results of suspended solids, percent organic, photosynthetic pigments, and nutrient analyses for the September sampling were similar to those obtained in the upper estuary (Great

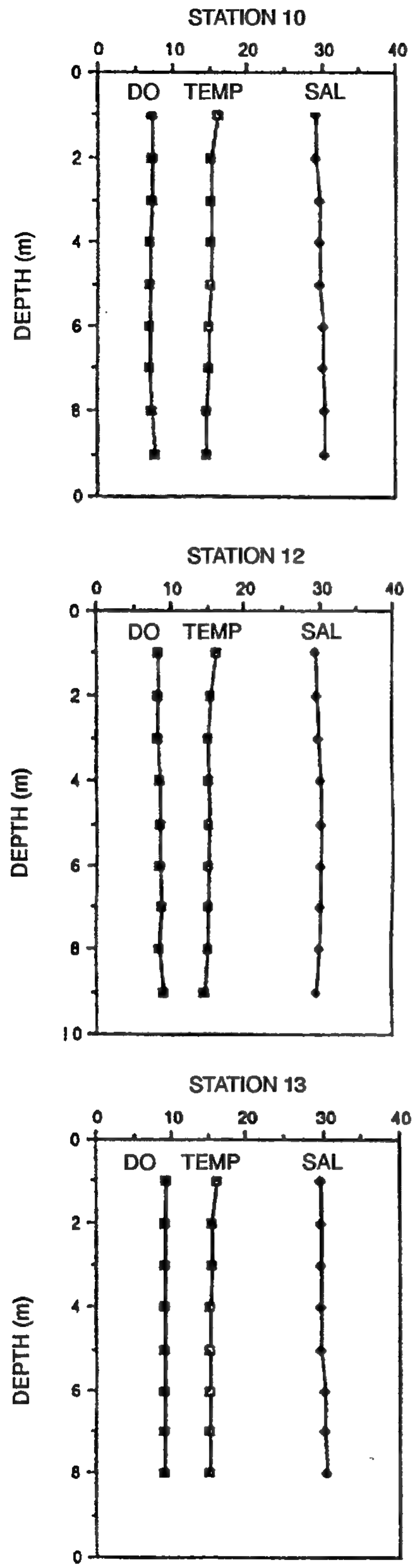


Figure 3-11. Vertical profiles of temperature, salinity, and dissolved oxygen at Stations 10, 12, and 13

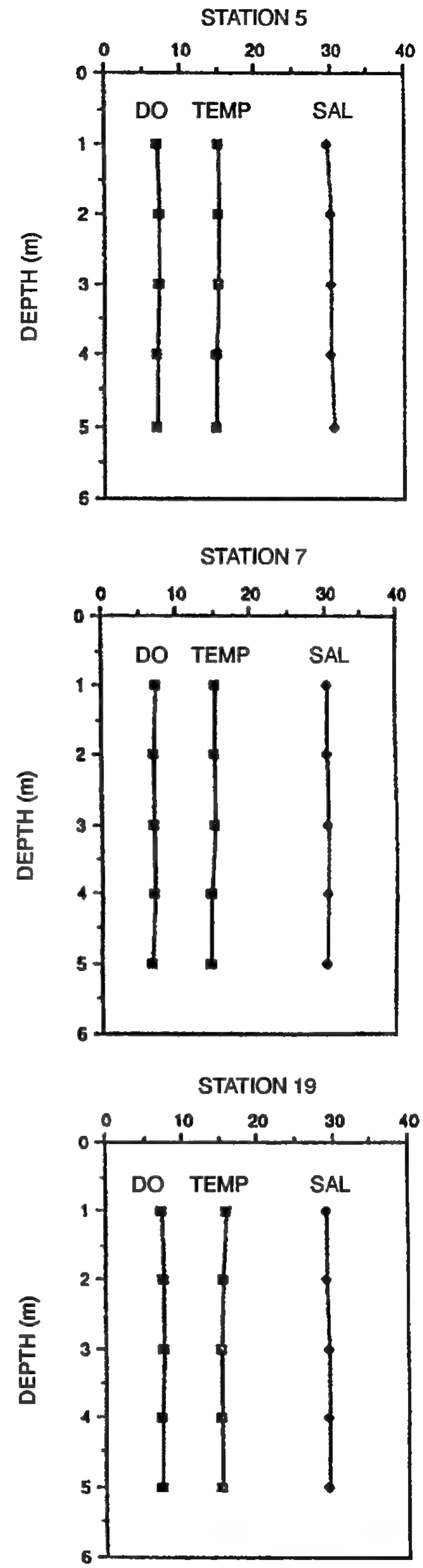


Figure 3-12. Vertical profiles of temperature, salinity, and dissolved oxygen at Stations 5, 7, and 19.

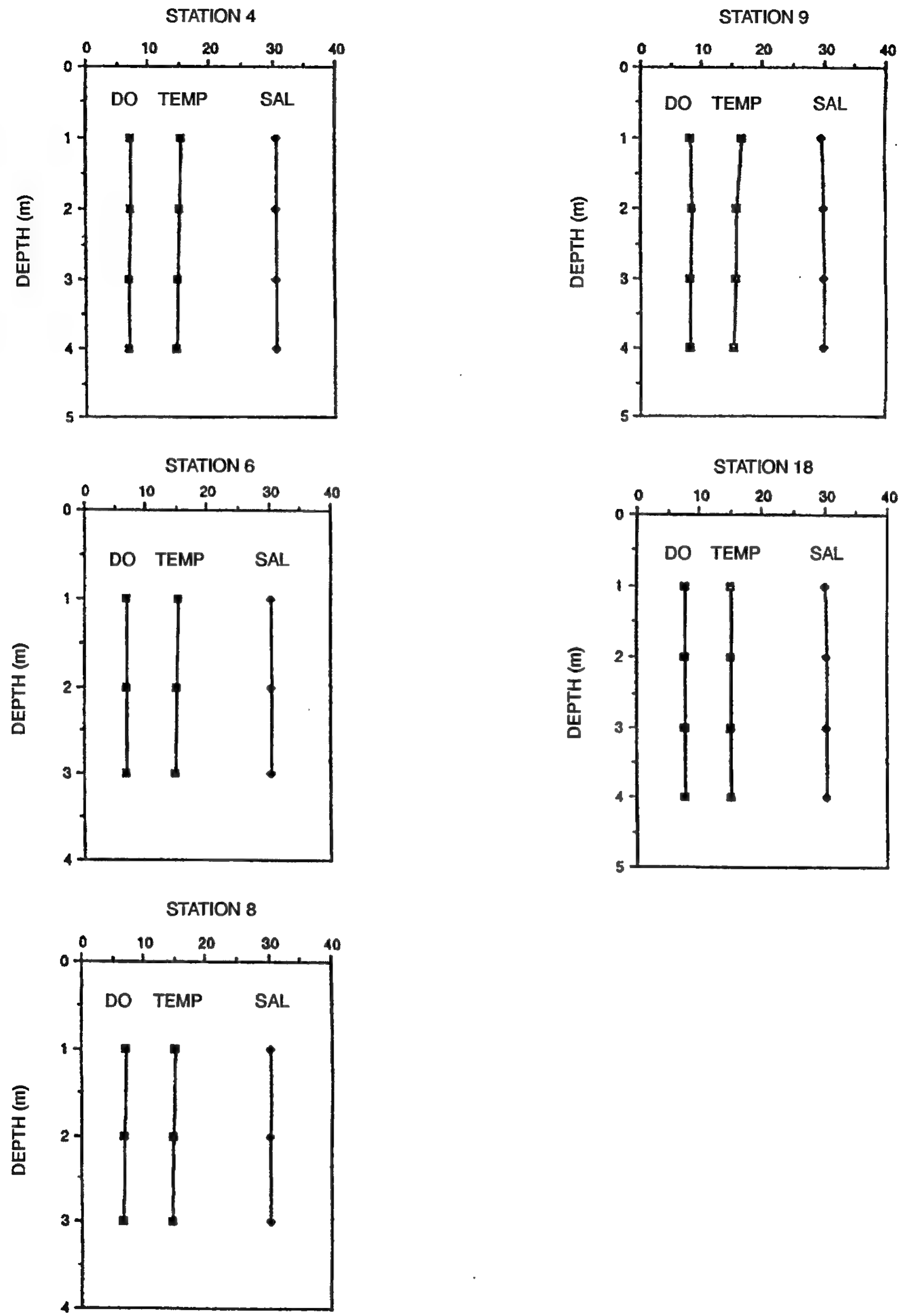
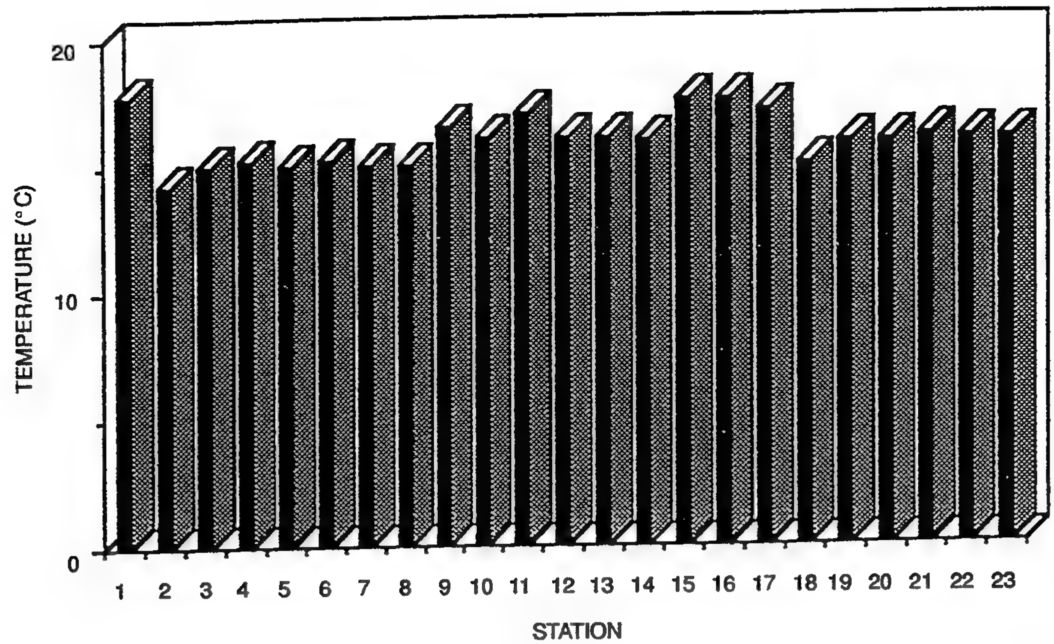


Figure 3-13. Vertical profiles of temperature, salinity, and dissolved oxygen at Stations 4, 6, 8, 9, and 18.



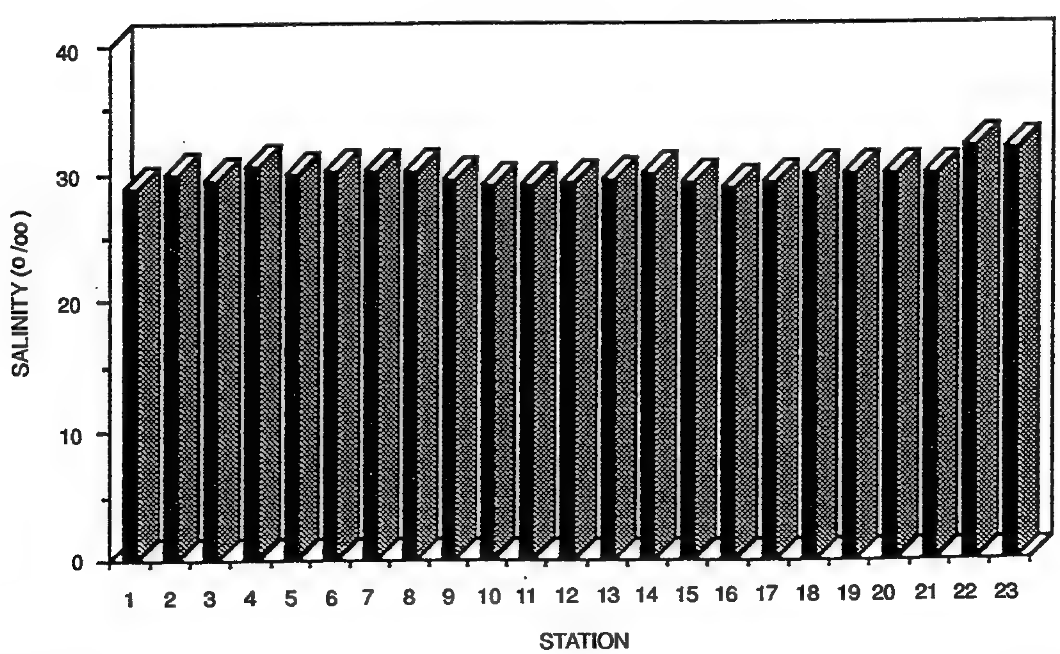
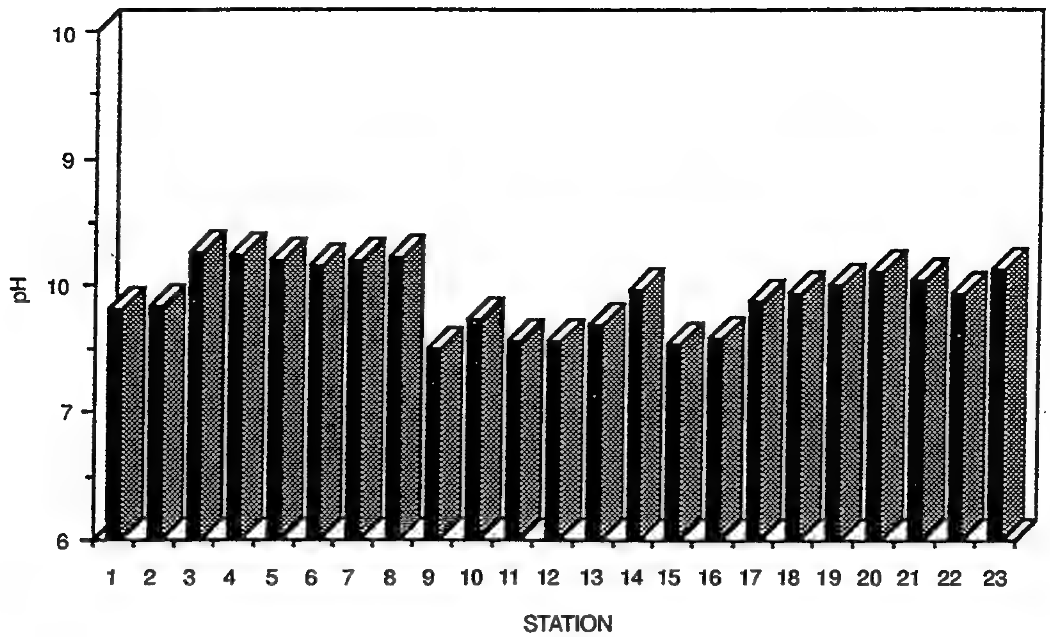


Figure 3-14. Subsurface temperature and salinity at all stations in September 1991. Stations 1–21 are in Portsmouth Harbor and Stations 22 and 23 are in York Harbor.



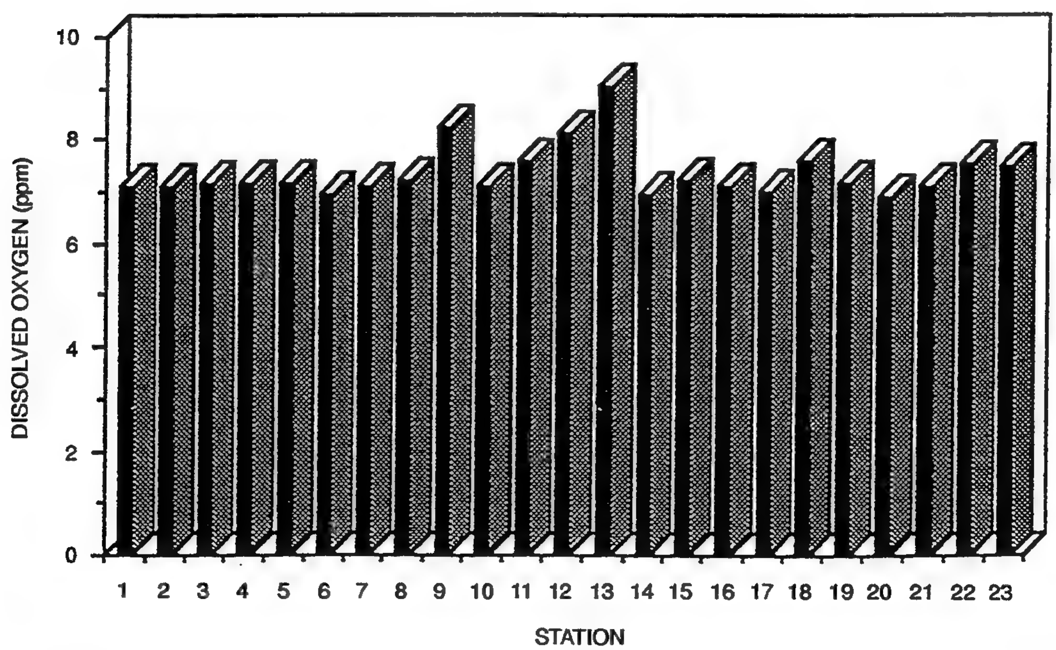
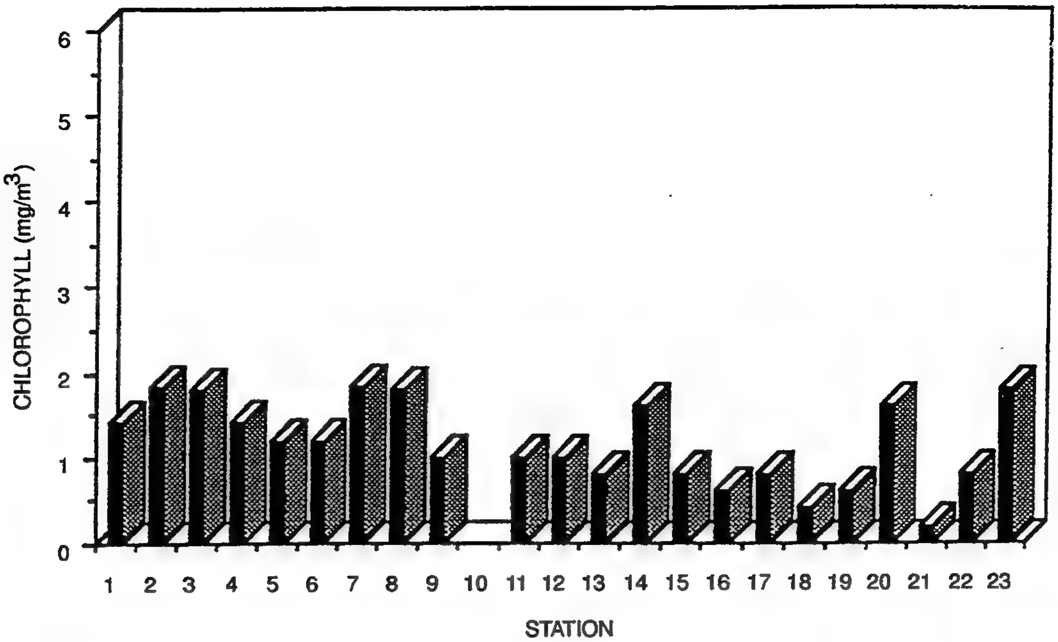


Figure 3-15. Dissolved oxygen and pH at all stations in September 1991. Stations 1–21 are in Portsmouth Harbor and Stations 22 and 23 are in York Harbor.



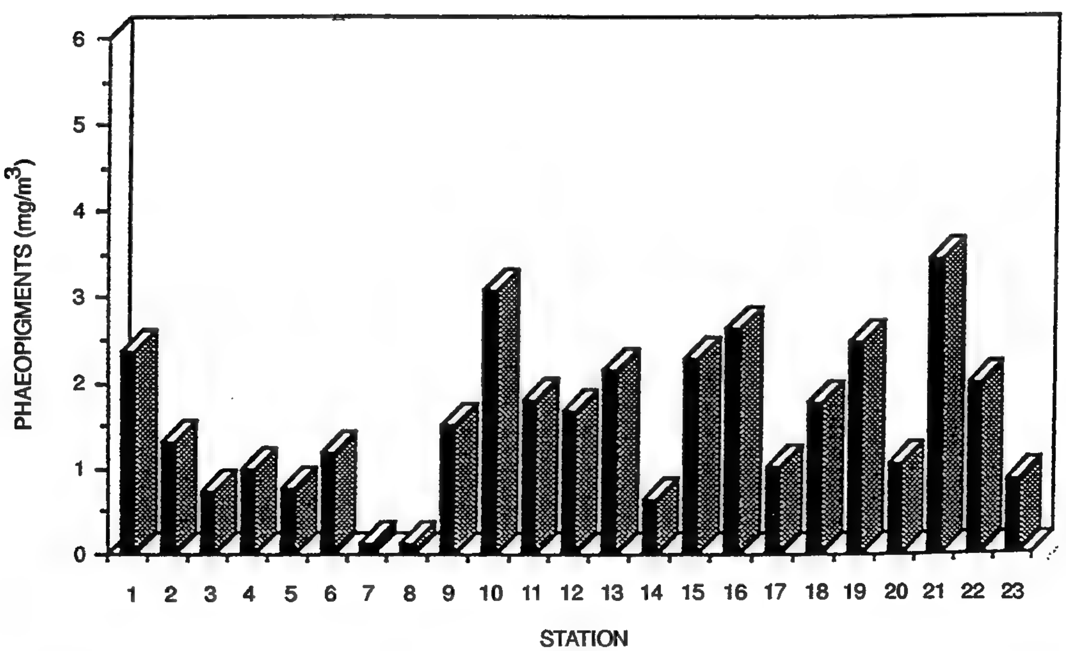
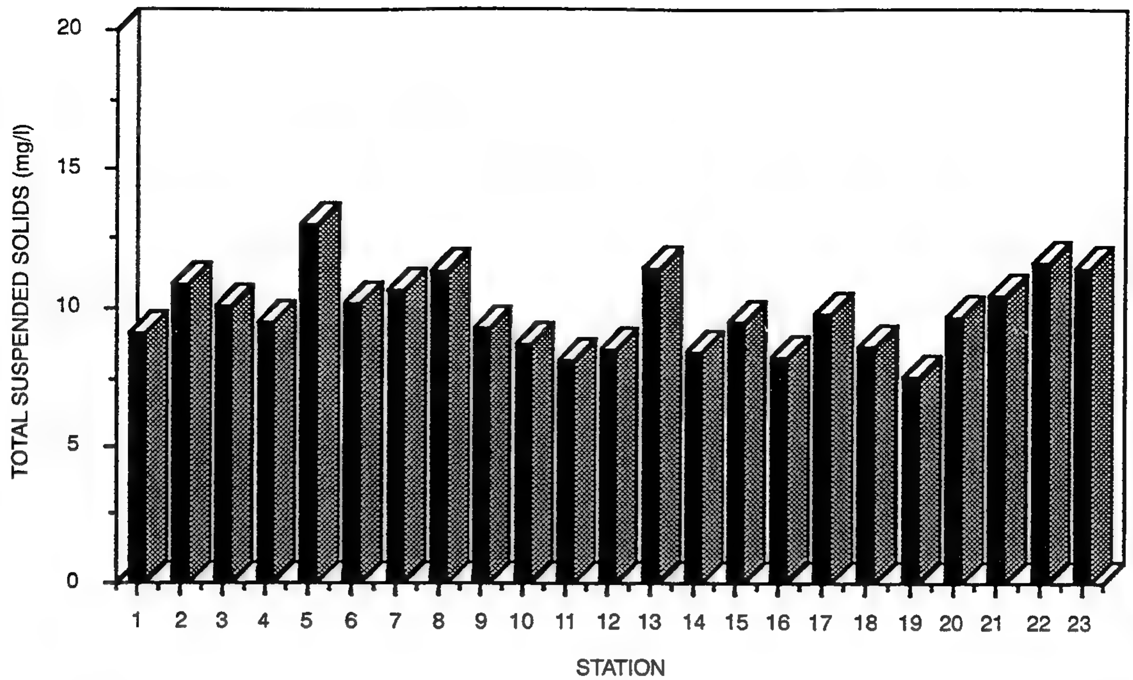


Figure 3-16. Chlorophyll *a* and phaeopigments at all stations in September 1991. Stations 1–21 are in Portsmouth Harbor and Stations 22 and 23 are in York Harbor.



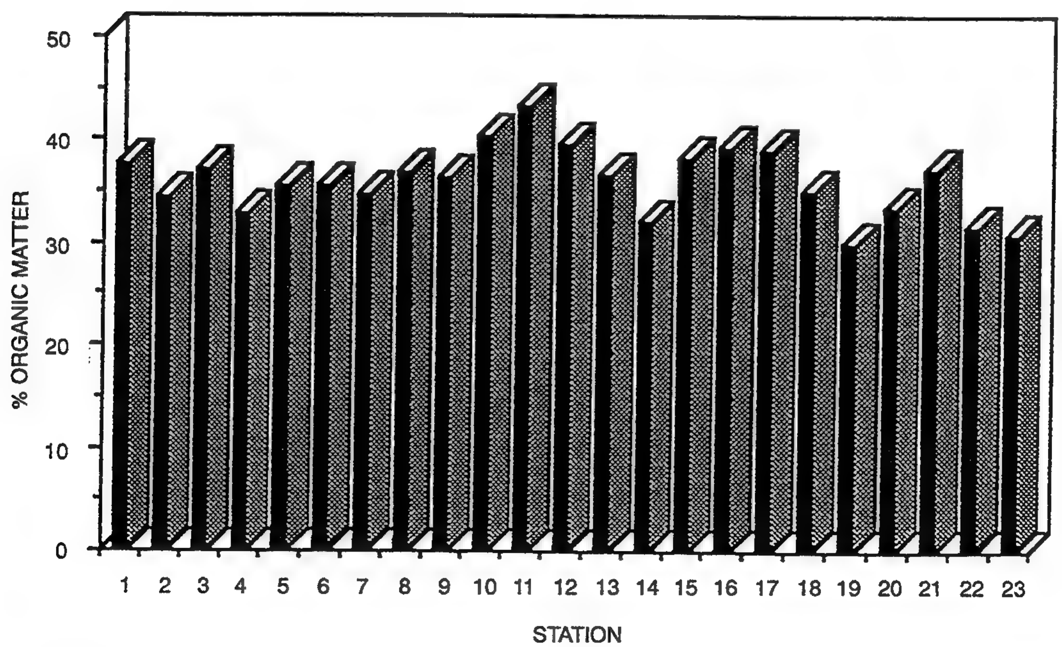


Figure 3-17. Total suspended solids and percent organic matter at all stations in September 1991. Stations 1–21 are in Portsmouth Harbor and Stations 22 and 23 are in York Harbor.

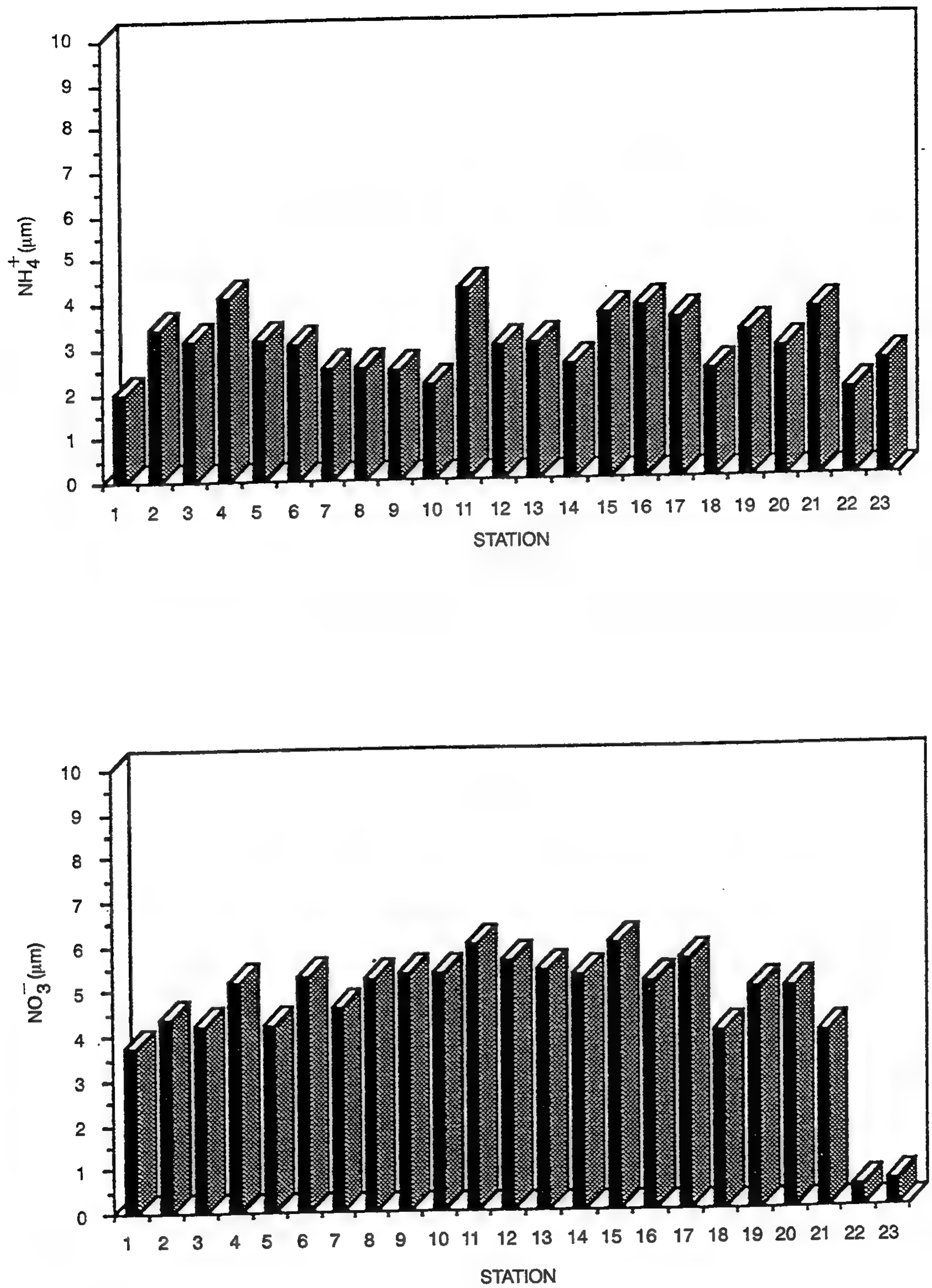


Figure 3-18. Concentrations of ammonium (NH_4^+) and nitrate (NO_3^-) at all stations in September 1991. Stations 1–21 are in Portsmouth Harbor and Stations 22 and 23 are in York Harbor.

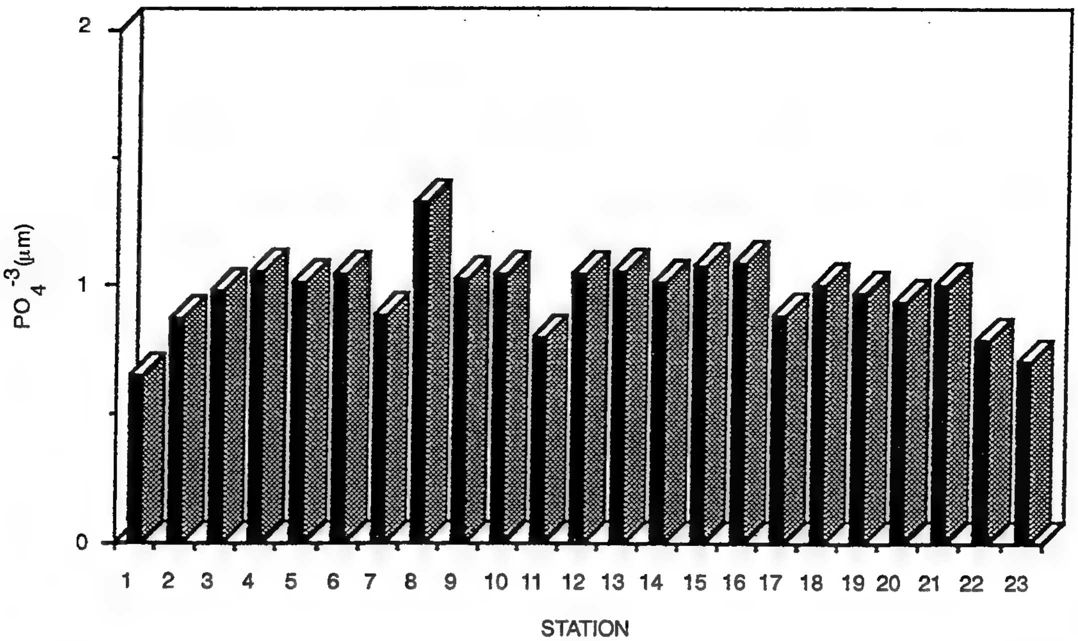


Figure 3-19. Phosphate (PO_4^{-3}) concentrations at all stations in September 1991. Stations 1–21 are in Portsmouth Harbor and Stations 22 and 23 are in York Harbor.

estuary (Great Bay) for the same time period (Langan, unpublished data). The water sample analyses for the September sampling can be summarized as follows:

Dissolved oxygen. Dissolved oxygen was at or above saturation levels (9 mg/l) for all stations.

Total suspended solids (TSS). Mean value for all stations for suspended solids was 9.86 mg/l (SD = 1.38 mg/l) and ranged from 7.51 to 13.04 mg/l. Highest concentrations were recorded at Stations 5, 13, 22, and 23, while lowest were found at Stations 11, 16, and 19.

Percent organic content on combustion. Mean for all stations was 36.54% (SD = 4.95%) and ranged from 28.95% to 55%.

Chlorophyll a. Concentrations of chlorophyll *a* were quite low, though not abnormally so for September in the lower estuary (Loder et al., 1983; Langan, unpublished data). The mean for all stations was 1.16 mg/m^3 (SD = 0.56) and ranged from 0.00 to 2.18 mg/m^3.

Phaeopigments. Phaeopigment concentration ranged from 0.12 to 3.45 mg/m^3 with a mean of 1.51 mg/m^3 (SD = 0.809).

NH_4^+. Mean concentration of ammonium for all stations was 3.00 µm (SD = 0.64) and ranged from 1.82 to 4.30 µm.

NO_3^-. Nitrate concentrations ranged from 0.44 to 6.01 µm and the mean for all stations was 4.39 µm (SD = 1.46). Samples from York Harbor (Stations 22 and 23) had nitrate concentrations an order of magnitude lower (0.50 µm) than the mean for Portsmouth Harbor.

pH. Mean value for pH was 7.93 (SD = 0.24). Values ranged from 7.50 to 8.29.

PO_4^{-3}. Phosphate concentrations ranged from 0.65 to 1.33 µm, with a mean of 0.97 µm (SD = 0.14). Highest concentrations were found in the samples from Clark Island Embayment (Stations 3–8).

The results of monthly sampling at the five stations in Portsmouth Harbor and at one reference station in York Harbor are shown in figures 3-20 to 3-23 (see Appendix C). Means and standard deviations for selected parameters are shown in figures 3-24 and 3-25. Similar seasonal trends were observed for all stations, and with the exception of uniformly low phosphate concentrations in November and December, were similar to seasonal trends for stations in Great Bay (Langan, unpublished data). A slight rise in chlorophyll *a* concentrations are coincident with the low phosphate levels in November and December. Total nitrogen (amonium + nitrate) and phosphate concentrations, as well as N:P ratios, for the monthly sampling stations are shown in figure 3-26. The low phosphate levels in November and December, as well as high total nitrogen during the same months, resulted in the highest N:P ratios for that time, particularly at Stations 15 and 23. Mean concentrations of total suspended solids and chlorophyll were lower and nitrate higher in Portsmouth Harbor stations than in Great Bay. Although between-station differences were observed in mean values for several parameters, only nitrate levels at Station 15 were significantly higher (ANOVA p<.05) than those at the other stations.

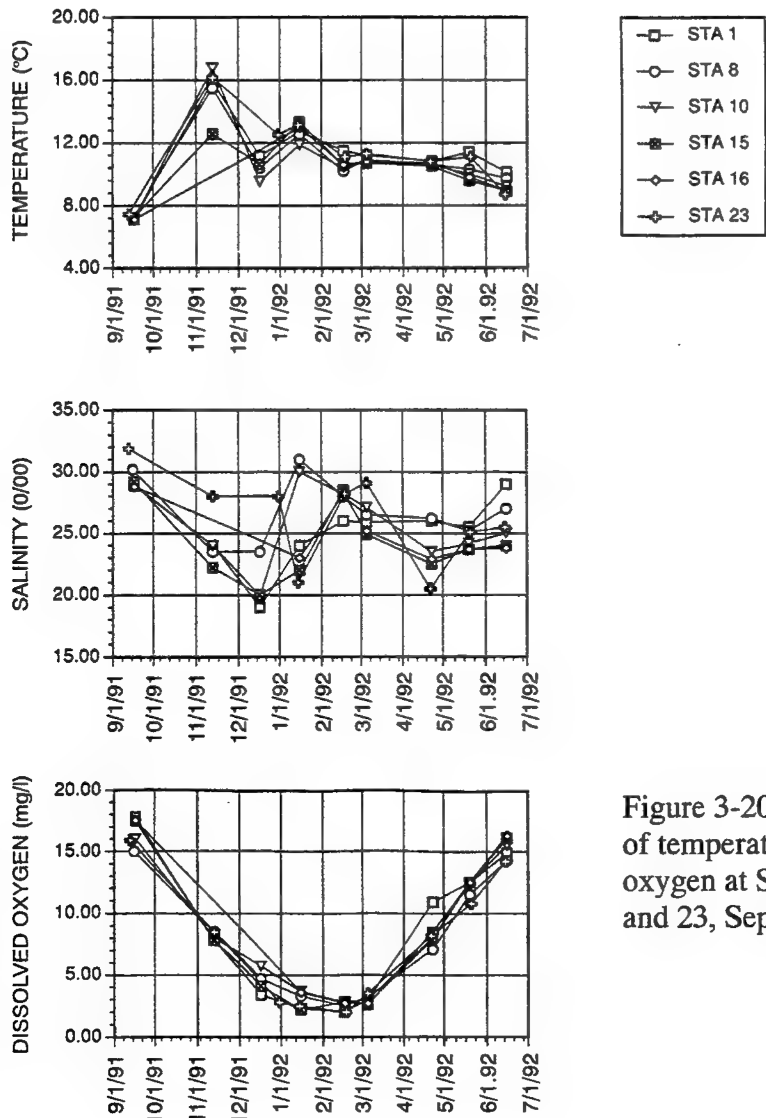


Figure 3-20. Monthly measurements of temperature, salinity, and dissolved oxygen at Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

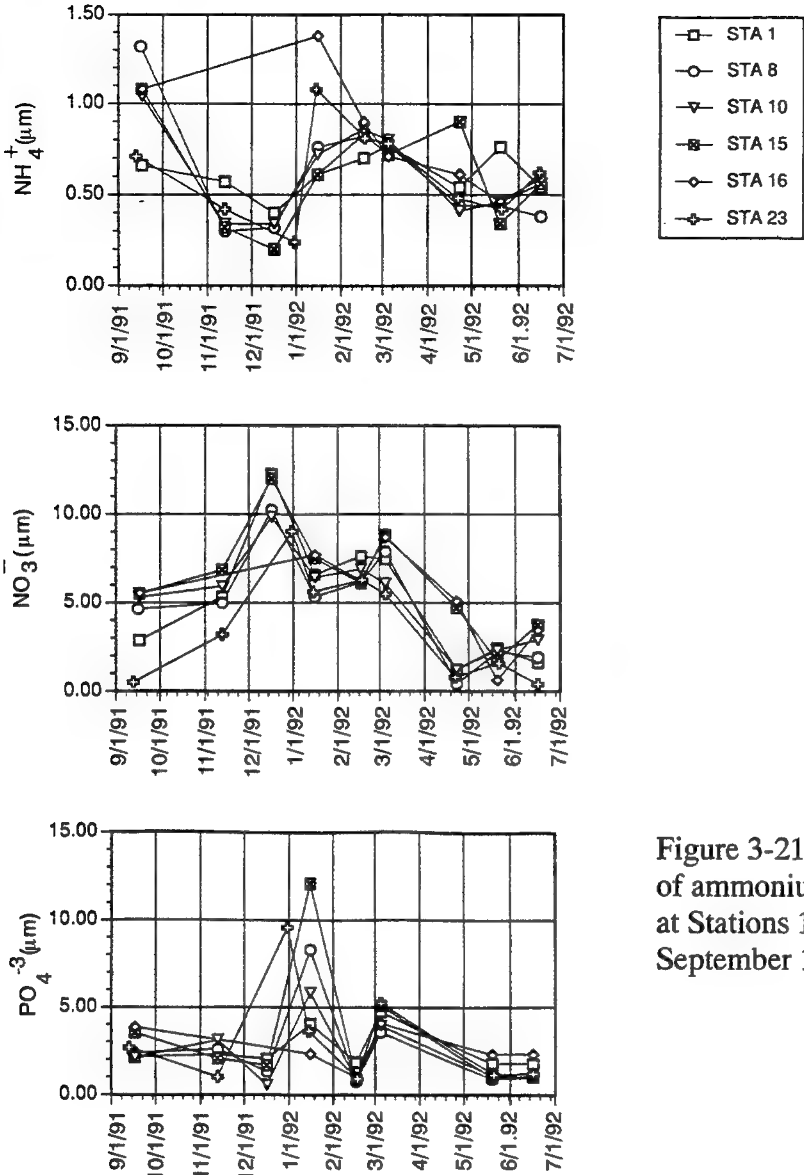


Figure 3-21. Monthly measurements of ammonium, nitrate, and phosphate at Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

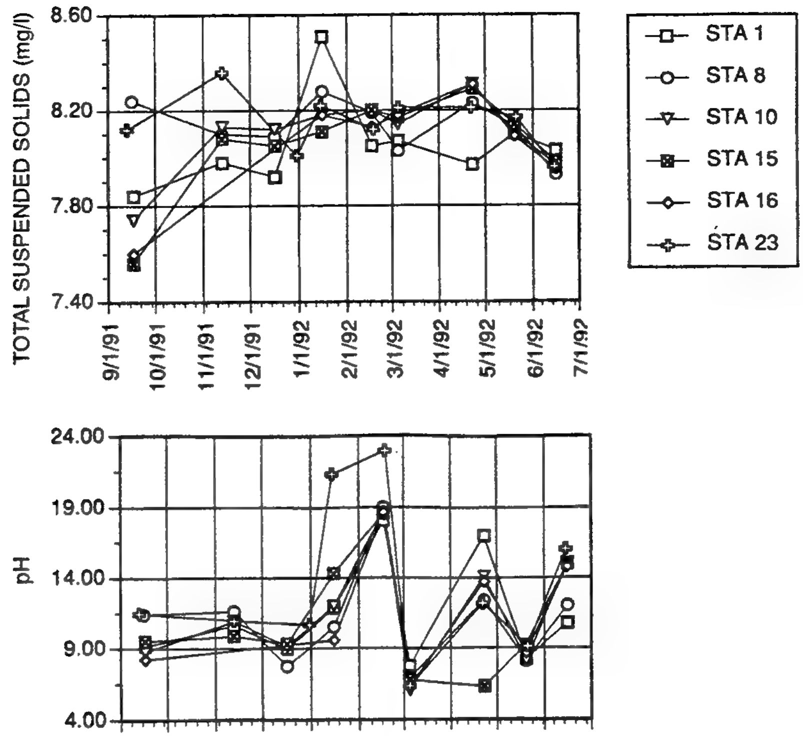


Figure 3-22. Monthly measurements of total suspended solids and pH at Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

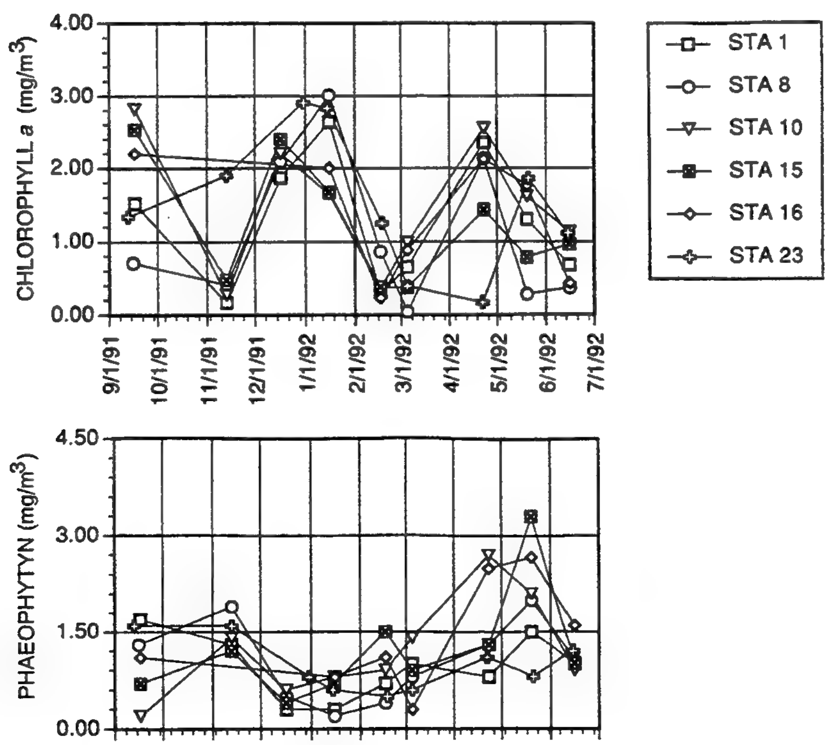


Figure 3-23. Monthly measurements of chlorophyll *a* and phaeophytyn at Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

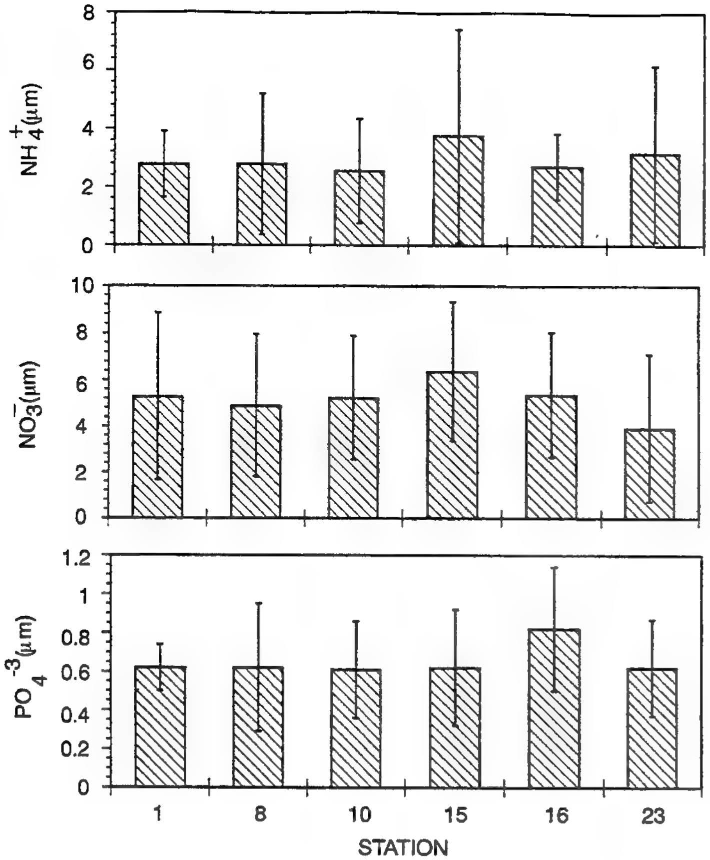


Figure 3-24. Mean and standard deviation (error bars) of ammonium, nitrate, and phosphate for Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

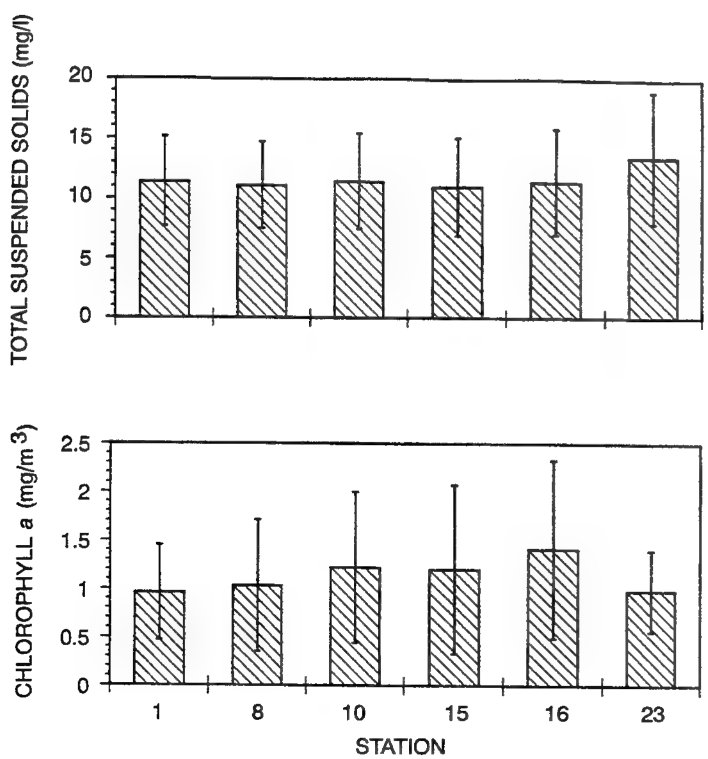


Figure 3-25. Mean and standard deviation (error bars) for total suspended solids and chlorophyll *a* for Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

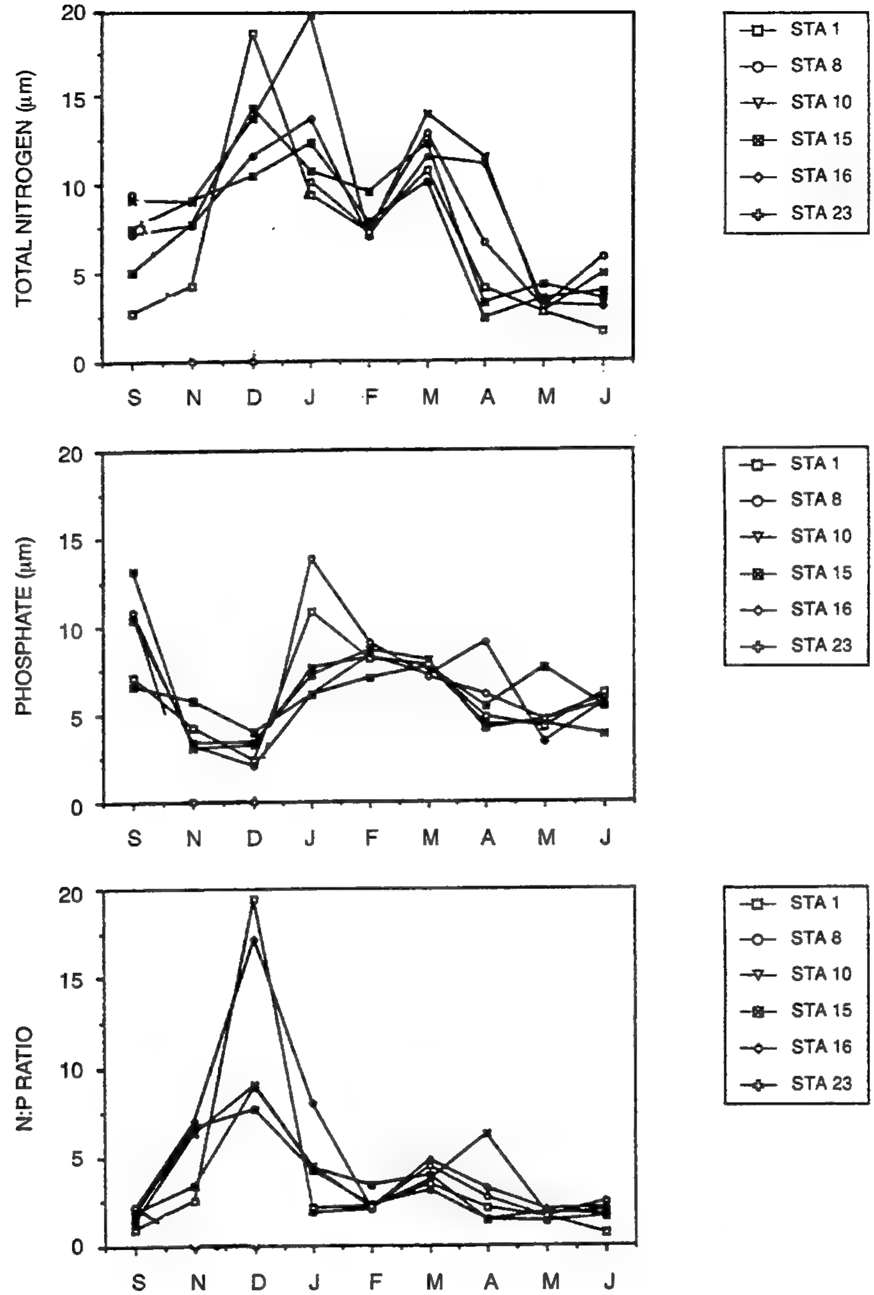


Figure 3-26. Monthly measurements of total nitrogen, phosphate, and N:P ratios for Stations 1, 8, 10, 15, 16, and 23, September 1991 to June 1992.

DISCUSSION

The objective of this study was to establish a baseline of water quality data for the lower Piscataqua–Great Bay Estuary. Since ecosystem responses and primary productivity can be affected by nutrient loading as well as industrial contaminants, it is important to document water quality conditions. For the September sampling, the differences between stations in Portsmouth Harbor was well within a reasonable range of values, considering the spatial and temporal heterogeneity. The only measurements that were somewhat unusual were the very low nitrate levels observed in York Harbor. This was not the case for monthly sampling. Although the mean concentration of nitrate was lowest at Station 23, it was not significantly different than four of the Portsmouth Harbor stations. Other than the significantly higher (ANOVA $p<.05$) mean concentration of nitrate at Station 15, no significant differences were observed between stations. With the exception of the low concentrations of phosphate measured in November and December, and the resulting high N:P ratios in these same months at all six monthly stations, seasonal patterns of total nitrogen, phosphate, and N:P ratios are not radically different than in Great Bay (Loder and Gilbert, 1977; Loder et al., 1983; Langan, unpublished data). There are major deviations from the Redfield 16:1 ratio, occurring during the low winter phosphate period mentioned, and during the phytoplankton bloom period in the spring when total nitrogen was reduced while phosphate was >0.3 µm for all stations. Mean as well as seasonal primary productivity (as measured by chlorophyll *a* concentrations) is lower in Portsmouth Harbor and York Harbor stations than in Great Bay, while mean nitrate concentrations are higher. The chlorophyll difference is not unexpected, and could be due to the timing of sampling (missing the highest chlorophyll concentrations), but higher nitrate concentrations generally occur in areas closer to freshwater input source (Fisher et al., 1988). There are several small creeks that input freshwater into the Portsmouth Harbor area; however, the most likely sources of the nitrogen are the sewage treatment plants in Portsmouth (advanced primary) and Kittery (secondary), and input to the Piscataqua River near Station 15 from North Mill Pond, an area in which high concentrations of nitrate were measured in 1989 (Langan, unpublished data).

3.4 WATER TOXICITY

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ABSTRACT

Water samples collected from 23 stations located in the Piscataqua Estuary were evaluated for water-column toxicity using the Sea Urchin (*Arbacia punctulata*) Fertilization Test. The test provides a reproductive endpoint for a species representative of lower trophic level invertebrates indigenous to the Piscataqua Estuary. The results of this assessment can be used to define site-specific toxicity and thus ecological risk to water-column organisms. Statistically significant reductions in fertilization were noted at three stations within the Clark Island embayment.

INTRODUCTION

Biota of coastal ecosystems, such as the Great Bay Estuary and the Piscataqua River, are often endangered by pollution pressures associated with urbanization from point sources, such as sewage effluents, and from nonpoint sources (atmospheric deposition, recreational activities, and agricultural drainage). In response, federal legislation, including The Water Pollution Control Act (1987), the Clean Water Act (1977), and the Water Quality Act (1977), has mandated the restoration and maintenance of all US waters. To meet these requirements, the states, the USEPA, and the National Pollution Discharge Elimination System (NPDES) have developed standardized methods, such as the Sea Urchin (*Arbacia punctulata*) Fertilization Assay, for measuring water-column toxicity in marine environments.

The sensitivity of this test offers several advantages to the investigator, aside from the positive economic considerations. Studies have shown that the reproductive, embryonic, and larval phases of many marine organisms are often more sensitive than the adult life-stage of the same species (Ringwood, 1992). Toxicity observed at these early stages indicates the impairment of reproductive success and results in an inability to recruit young, a population effect potentially detrimental to ecosystem health. In addition, because chemical contaminants may be biologically unavailable or because toxic effects may occur at or below chemical detection limits, data obtained from chemical analyses are often difficult or impossible to interpret without effects data obtained during toxicity testing.

METHODS

Water column samples from 23 stations (1–21 in Portsmouth Harbor and 22 and 23 in York River; see figure 2-7) were evaluated for toxicity at SAIC's Environmental Testing Center using the Sea Urchin Fertilization Assay following ERLN SOP 1.03.006 (Mueller et al., 1992). Subsurface grab samples were collected according to UNH-JEL SOP 1.05 between September 13 and September 17, 1993, during an outgoing tide from stations downstream from the Shipyard and during an incoming tide at stations above the Shipyard. Toxicity tests were conducted between October 8 and October 9, 1991. The storage and transport of all samples exceeded the recommended 48-hour limit, which might have resulted in some degradation and

loss of toxicity. No salinity adjustments were required. Gametes were obtained from adult sea urchins by electrical stimulation. Sperm were exposed to water-column samples collected from each station for 1 hour before the eggs were added. After 20 minutes, the test was terminated by the addition of a preservative. Eggs were examined microscopically for the presence of a membrane, which would indicate that fertilization was successful. Filtered water from Narragansett Bay, RI, was used as the performance control. Arcsine transformed data were statistically analyzed using a one-way unpaired t-test (alpha = 0.05). Results were incorporated into the project database system.

RESULTS AND DISCUSSION

Results are presented in Appendix D and summarized graphically in figure 3-27. Toxicity differed significantly ($P \leq 0.05$) from the control at Stations 3, 4 and 7, all located in the Clark Island embayment. Violation of the 48-hour holding period may have resulted in the degradation and loss of toxicity in the water samples from the other 20 stations, although studies have not been conducted to determine decay rates. Nevertheless, results of the water toxicity test are useful in evaluating relative toxicity between stations. Even though the holding time was exceeded, all samples were handled in the same manner; thus, any effect of holding time would have been the same for all samples.

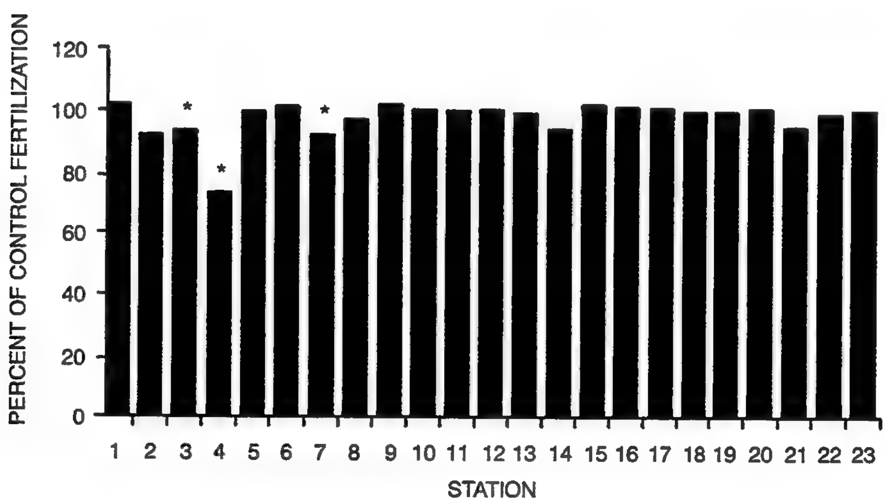

Figure 3-27. *Arbacia* fertilization expressed as a function of control response (* = statistically significant difference).

3.5 MICROBIAL CONTAMINATION IN WATER AND SEDIMENTS

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ABSTRACT

An assessment was made, from September 1991 to June 1992, of fecal-borne microbial contamination of sediments and water around the Shipyard. Measurements were made of *Clostridium perfringens* in the water and in surface and subsurface sediments at 23 stations in the vicinity of the Shipyard and in York Harbor in September 1991, then in water samples from six of the same stations and at other stations in the Great Bay Estuary at monthly intervals through June 1992. Monthly measurements were also made of enterococci, a more ephemeral indicator of fecal contamination, to compare trends for long-term and short-term fecal contamination in water. *C. perfringens* concentrations were relatively low in water samples near the Shipyard, especially compared with the Squamscott River site further up the estuary. Stations 15 and 16 exhibited consistently higher levels compared with other sites near the Shipyard, and Station 23 in York Harbor generally had the lowest levels of all sites. Enterococci levels steadily decreased from relatively high levels in November to low levels in March through June. In general, the highest levels of contamination in surface sediments and sediment cores were near Seavey Island and the Rt. 95 bridge, while lower levels of *C. perfringens* were apparent at sites in channels away from the Piscataqua River and in York Harbor. This study is useful for determining the distribution of fecal contamination near the Shipyard in relation to other areas in and near the estuary, and will be helpful for evaluating the contribution of other contaminants in the harbor from the Shipyard in relation to other sources associated with fecal contamination.

INTRODUCTION

A critical task in assessing the impact of a source of pollution on its surrounding environment is to separate the impact of the target source from the influence of other sources. The Shipyard has different types of waste materials located at a variety of sites around Seavey Island that could have an impact on the surrounding environment. However, other sources of some of the same potentially toxic materials exist or have existed close to Seavey Island. For example, the outfall for effluent from the Portsmouth municipal wastewater treatment facility is in the channel of the Piscataqua River near Seavey Island, and other sewage effluent and storm drain outfall pipes are also located in and around Portsmouth Harbor. In addition, more historic sources of heavy metals and PAHs located upstream in Portsmouth and near Dover, NH, could also be sources of the pollutants that have accumulated in the sediments near Seavey Island. Thus, any potential impact of toxic organic and inorganic compounds on the biota in Portsmouth Harbor may not necessarily be solely attributed to the Shipyard.

Many of the sources of potentially toxic pollutants in Portsmouth Harbor are also sources of fecal contamination, whereas this is only a minor component of the wastes coming from the Shipyard. Thus, the use of indicators of fecal contamination could help to assess the relative toxicological influence of the more fecally contaminated pollution sources on the biotic

communities in Portsmouth Harbor. There are numerous bacteria, bacteriophages, and viruses that are common to the microbial communities in the intestines of warm-blooded animals, and some of these organisms are quite specific indicators of fecal contamination. The detection of some of these microbial indicators of fecal contamination could help fingerprint the distribution of fecally contaminated sediments in Portsmouth Harbor.

The present study is an attempt to determine the environmental impact of Shipyard wastes and toxic materials that have been or are presently being released into the environment. Most fecal indicator microorganisms cannot survive for decades, which is the time scale over which Shipyard waste materials could have had an influence on the environment, and would therefore be of little use as indicators of the presence of fecal contamination in sediments. However, one fecal-borne bacterium, *Clostridium perfringens*, will respond to certain environmental stresses by forming spores that can survive for hundreds of years. The longevity of the endospore makes this organism especially useful for the study of long-term fecal contamination.

In the present study, *C. perfringens* was used as an indicator to determine the distribution of fecal pollution in sediments around Portsmouth Harbor. The concentrations of *C. perfringens* and enterococci in water-column samples from sites throughout the Harbor were also measured as a potential means of locating existing sources of fecal pollution. Two sites in York Harbor were included in this investigation as reference sites.

OBJECTIVES

The purpose of the first portion of this study (September 1991–June 1992) was to gain information on the past and present fecal contamination of sediments and water in Portsmouth and York Harbors. *Clostridium perfringens* and enterococci were used as bacterial indicators of long-term and more recent fecal pollution, respectively. The specific objectives of this study were

- to determine the potential existing sources and distribution of fecal contamination in Portsmouth Harbor water
- to determine the distribution of fecal contamination in surface sediments to establish a fingerprint of pollutants from mixed fecal-toxic sources in Portsmouth Harbor
- to determine seasonal and spatial patterns of fecal contamination of the waters of Portsmouth and York Harbors

METHODS

Sediment and water samples were collected without difficulty from 23 sites (Stations 1–23; see figure 2-7) following SOP procedures (Mueller et al., 1992). The key aspect was that no cross-contamination occurred and that samples were adequately preserved to minimize stress to the microbes. Water and sediment samples were all analyzed for *C. perfringens* according to SOP procedures, also without difficulty. Details of the procedures are described in UNH-JEL SOP 1.09 and ERLN SOP 1.03.017 for enumeration of *C. perfringens* in sediments and marine waters, respectively (Mueller et al., 1992).

Monthly water samples collected during and after the November 1991 sampling were also analyzed for enterococci by accepted methods (USEPA, 1986). This additional information was included to compare the indicator of long-term fecal contamination (*C. perfringens*) with an indicator of more short-lived duration (enterococci) that would be indicative of recent fecal contamination. Enterococci is also the indicator currently used by both the State of Maine and the State of New Hampshire as the standard for assessing the sanitary quality of marine recreational waters, and data collected by the present study can be compared with data collected by both states for surrounding waters.

RESULTS AND DISCUSSION

WATER SAMPLES

In general, concentrations of *C. perfringens* in water samples collected from Portsmouth and York Harbors on one sample date in September 1991 were relatively low (figure 3-28 and Appendix E.3). Samples from the York Harbor control sites contained 1 to 4 colony-forming units (cfu)/100 ml, with an average of 2 cfu/100 ml. Station 21 in Spruce Creek also had a low (1 cfu/100 ml) level of contamination. Levels of *C. perfringens* at the other sites indicated more contamination, although not to a great extent. The levels for each sample ranged from 1 to 14 cfu/100 ml, with the samples from Station 16 on the Maine side of the Piscataqua River near the Rt. 95 bridge being the highest with an average of 12 cfu/100 ml.

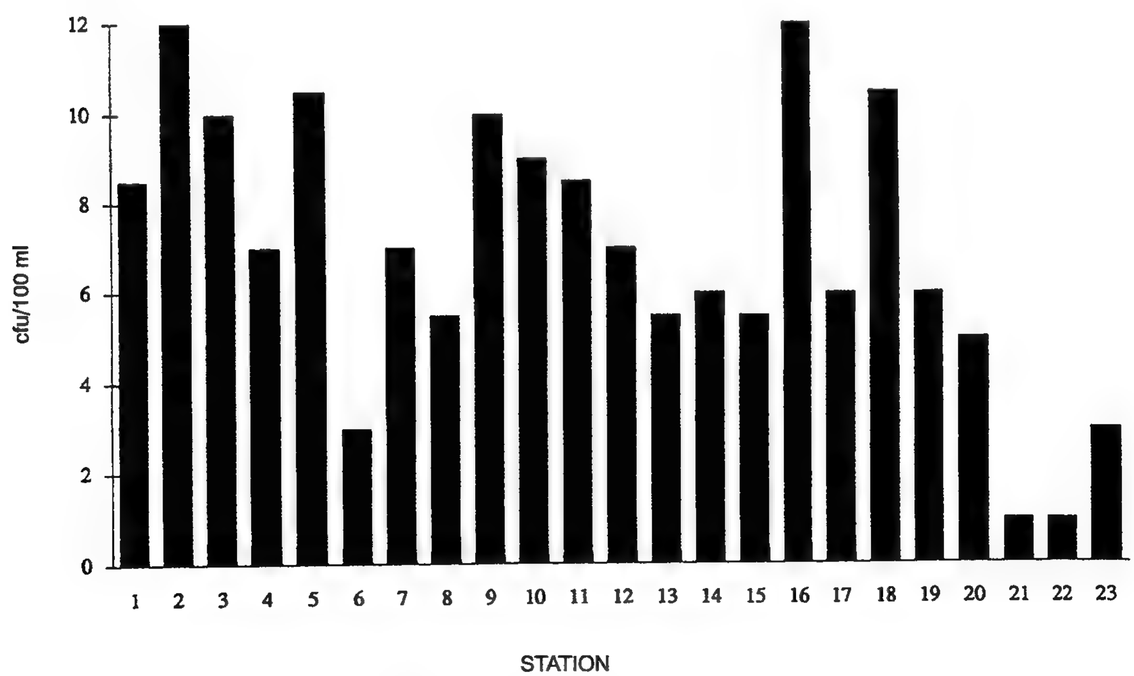

Figure 3-28. *C. perfringens* concentrations in water samples from Portsmouth Harbor (Stations 1–21) and York Harbor (Stations 22 and 23), September 1991.

A monthly monitoring of water samples from sites representative of the different areas in the two harbors showed monthly and seasonal variations. Figure 3-29 shows the levels of *C. perfringens* in the September 1991 sample to be the lowest at most sites in Portsmouth Harbor compared with the ensuing monthly samplings, with a return to lower levels in May and June. Levels of *C. perfringens* were generally relatively low, except for the February 1992 sample at Station 16, which was 94 cfu/100 ml. The variability between stations was such that no site was always either the most or the least contaminated. When the six sites were ranked, Stations 15 and 16 had the highest level of contamination. Station 23, followed by Station 10, had the lowest level of contamination. Surprisingly, Station 1 was as contaminated as Stations 8 and 10, which are close to a discharge pipe for the Shipyard.

Because levels of *C. perfringens* in Portsmouth Harbor were relatively low, water samples were collected at low tide from other areas in the Great Bay Estuary and analyzed for *C. perfringens* to allow for comparison (figure 3-30). The levels at Adams Point in Great Bay and the mouth of the Squamscott River were compared with the levels of *C. perfringens* in York Harbor and the average for all five sites in Portsmouth Harbor. As discussed above, the levels of *C. perfringens* in York Harbor were generally lower than those in Portsmouth Harbor. However, the levels at both Portsmouth and York Harbor sites were always lower than levels observed for the two sites located further up the estuary. This is not surprising for the Squamscott River site, which is downstream from urban Exeter, the town of Stratham, and two municipal wastewater treatment facilities in Exeter and Newfields that have been recently improved. However, Adams Point is located in the only area in New Hampshire where shellfish can be recreationally harvested. Because of the capacity for long-term survival of the *C. perfringens* endospore, the observed contamination levels may not reflect recent contamination. Site comparisons suggest that there are no existing sources of untreated fecal contamination in Portsmouth Harbor that have any more of an influence on water quality than those in the approved shellfish-growing area of the estuary.

Monthly samples of water collected at the five Portsmouth Harbor and one York Harbor sites revealed a definite trend in enterococci levels at all stations (figure 3-31). Entercocci concentrations declined from their highest levels in November to the lowest levels in March. Ranking of the sites showed little difference between contamination levels at the different stations. Stations 1, 8, 15, and 23 had the highest enterococci levels, while Stations 10 and 16 had somewhat lower levels of contamination. This same trend stands whether September and November samples are included, months where there were no samples collected from Station 16. In contrast to *C. perfringens* levels, station 23 in York Harbor did not consistently have the lowest levels of entercocci, while levels at Station 16 were relatively low. Thus, the distribution of more recent fecal contamination, based on enterococci levels, differed from that indicated by *C. perfringens* levels, except that Station 15 was the most contaminated by both measures. In comparison with the other areas in the estuary, levels of enterococci near the Shipyard were relatively low most of the time (figure 3-32), in a similar fashion to levels of *C. perfringens* (figure 3-30).

BOX CORE SURFACE SEDIMENT SAMPLES

The concentrations of *C. perfringens* in surface sediments were measured in September 1991 to determine the distribution of *C. perfringens*/fecal contamination deposited relatively recently in sediments at different sites in the two harbors (figure 3-33 and Appendix E.3). Concentrations of *C. perfringens* in sediments are expressed as most probable number (MPN) estimates

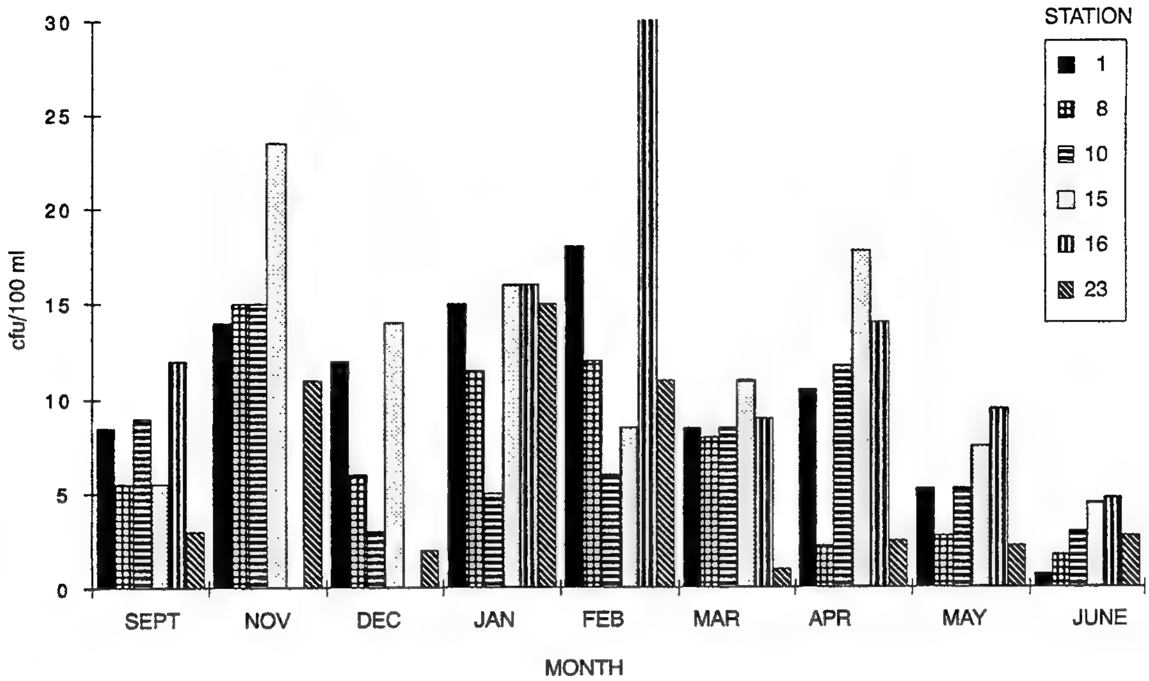

Figure 3-29. Monthly concentrations of *C. perfringens* in water at Portsmouth (Stations 1–16) and York (Station 23) Harbors.

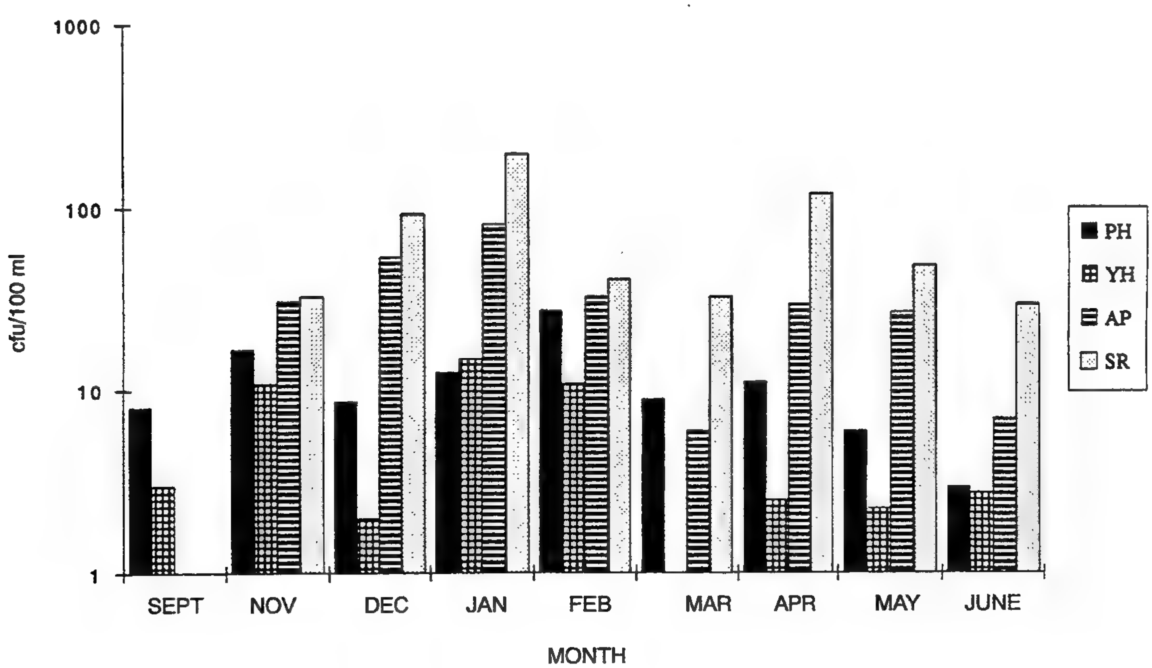

Figure 3-30. Monthly concentrations of *C. perfringens* in water samples from different areas in the Great Bay Estuary, including Portsmouth Harbor (PH), York Harbor (YH), Adams Point (AP), and Squamscott River (SR).

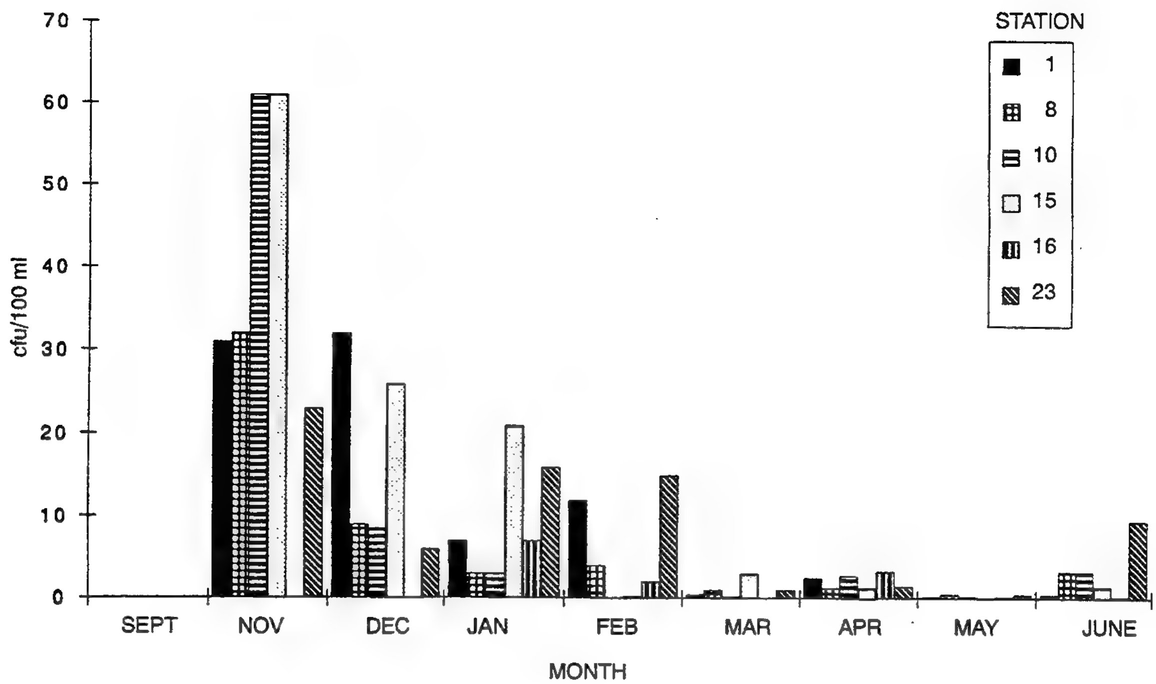

Figure 3-31. Monthly concentrations of enterococci in water samples from Portsmouth (Stations 1–16) and York (Station 23) Harbor.

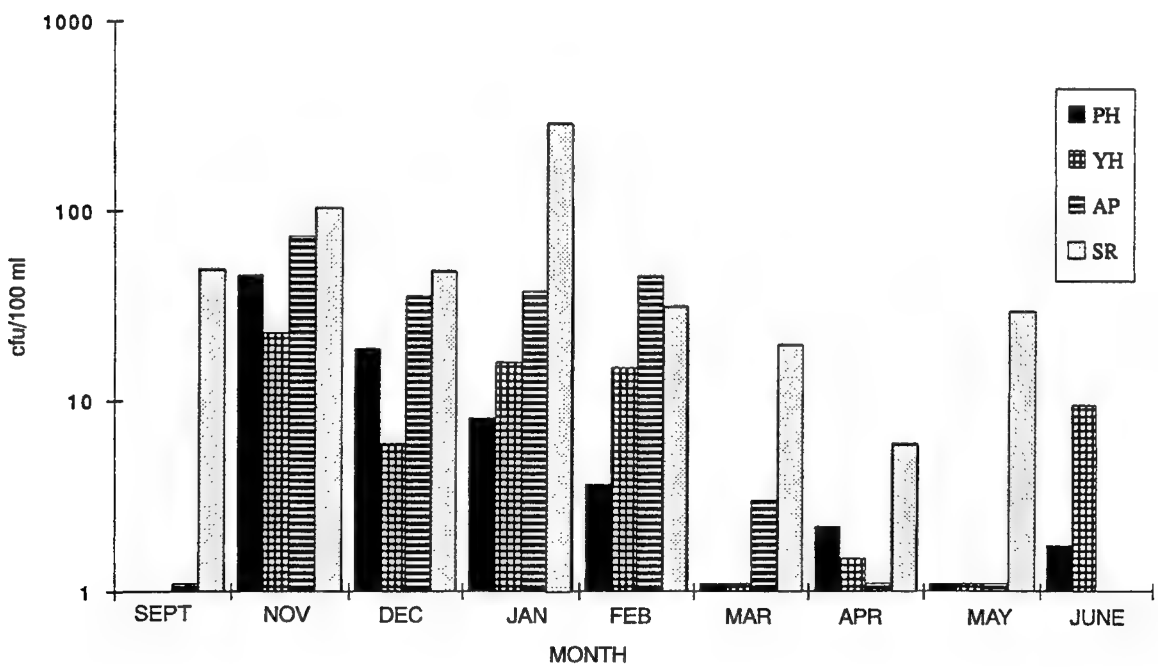

Figure 3-32. Monthly concentrations of enterococci in water samples from different areas in the Great Bay Estuary.

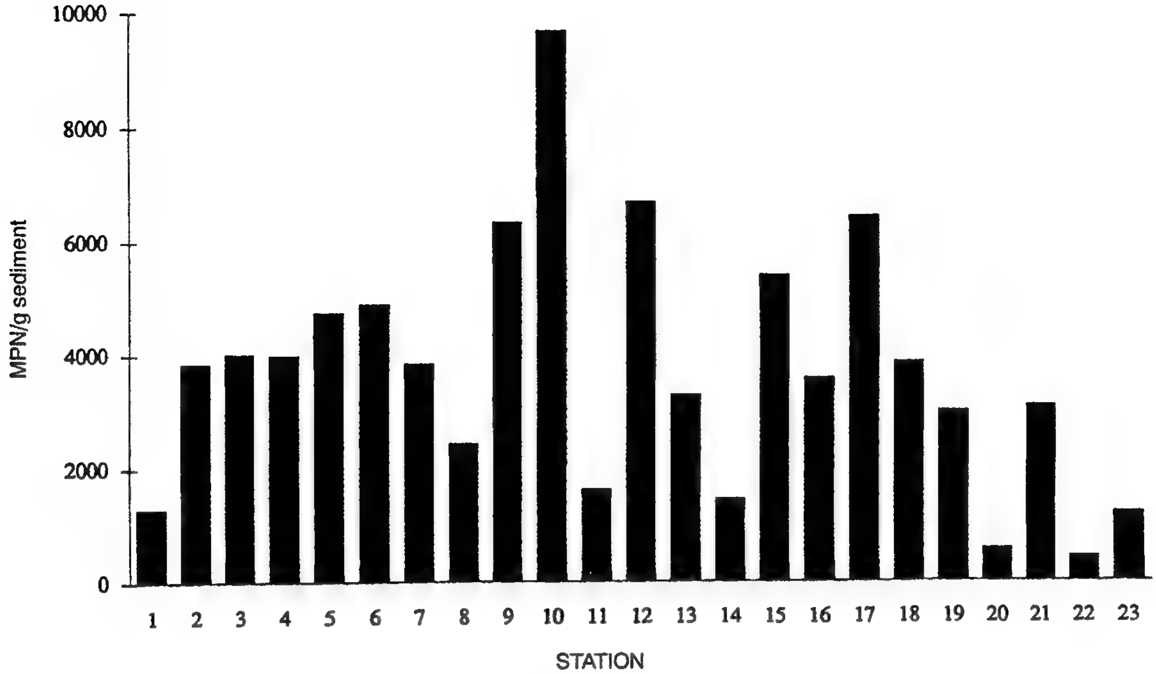

Figure 3-33. *C. perfringens* concentrations in surface sediments from Portsmouth (Stations 1–21) and York (Stations 22 and 23) Harbors, September 1991.

per gram wet weight sediments because dry weight data were not available. MPN values were averaged arithmetically to compare sites. Some stations showed a wide variation in levels among the four samples collected. For example, Station 10 values ranged from 320 to 32,000 MPN/g. Generally, *C. perfringens* levels fell into three ranges. The lowest levels of contamination had <1000 MPN/g, whereas the stations with the highest contamination had >5000 MPN/g, with all other sites having *C. perfringens* levels between these values. Only two sites showed average MPN values less than 1000 MPN/g, Station 22 in the York River and Station 20 in Spruce Creek; the next lowest levels were at Station 23 in the York River, which had 1200 MPN/g. Sites where the MPN values were less than 5000 MPN/g included two stations (1 and 2) near the mouth of the Piscataqua River, the other Spruce Creek station (21), 6 of the 7 stations in the Clark Island embayment (2-8), the two stations near Pierce Island (11 and 14), the two Back Channel sites (18 and 19), Station 16 on the Maine side of the Piscataqua River near the Rt. 95 bridge, and Station 13 close to Seavey Island near Badgers Island. The sites where the MPN values exceeded 5000 MPN/g were Station 9 in the Clark Island embayment, Stations 10 and 12 near the dry docks, Station 15 on the NH side of the Piscataqua River near the Rt. 95 bridge, and Station 17 off Badgers Island. In general, the highest levels of contamination were at sites around Seavey Island and the Rt. 95 bridge, while lower contamination was apparent at sites away from the channel of the Piscataqua River, i.e., in York Harbor and Spruce Creek, off Gerrish and Pierce Islands, and in the back channel behind Pierce Island.

VIBRACORE SEDIMENT SAMPLES WITH DEPTH

Sediment cores from 19 of the 23 sites were collected and analyzed for *C. perfringens* concentrations (Appendix E.2). MPN values for site concentrations in different horizons of the sediment cores were averaged arithmetically and compared between depths and sites. All the upper layer sediments at all sites contained *C. perfringens*, ranging from 1200 MPN/g at Station 21 to 16,500 MPN/g at Station 17 (figure 3-34). *C. perfringens* could not be detected in some lower sediment layers at sites 11, 15, 16, 20, and 21. The highest levels for a given sediment layer were found at lower sediment layers at Stations 10 (16,000 MPN/g in layer C) and 15 (>16,000 MPN/g in layers C and D). Of the 19 sites where cores were collected, concentrations of *C. perfringens* decreased with depth at 12 stations (1, 2, 3, 6, 7, 11, 14, 16, 17, 19, 20, and 21), suggesting that fecal pollution within the sediment has been of more recent origin. The four stations (4, 10, 12, and 15) where levels increased with depth are indicative of fecal contamination being greater in the past with more recent, less contaminated sediment overlying older, more contaminated sediment. At two stations (5 and 13), levels increased, then decreased, indicative of a distinct middle layer being more contaminated than more recent and older sediments. The remaining station (8) had levels that were nearly the same with depth. The lowest levels of *C. perfringens* were apparent in sediments from sites located away from the river channel. *C. perfringens* levels in cores from Stations 1, 11, 20, and 21 were low in the top horizon and either extremely low or not detected in lower horizons. This pattern of contamination suggests that fecal pollution sources have had a greater impact on sediment and water at sites closer to the Piscataqua River channel than at sites in the Portsmouth Harbor area that are removed from the channel.

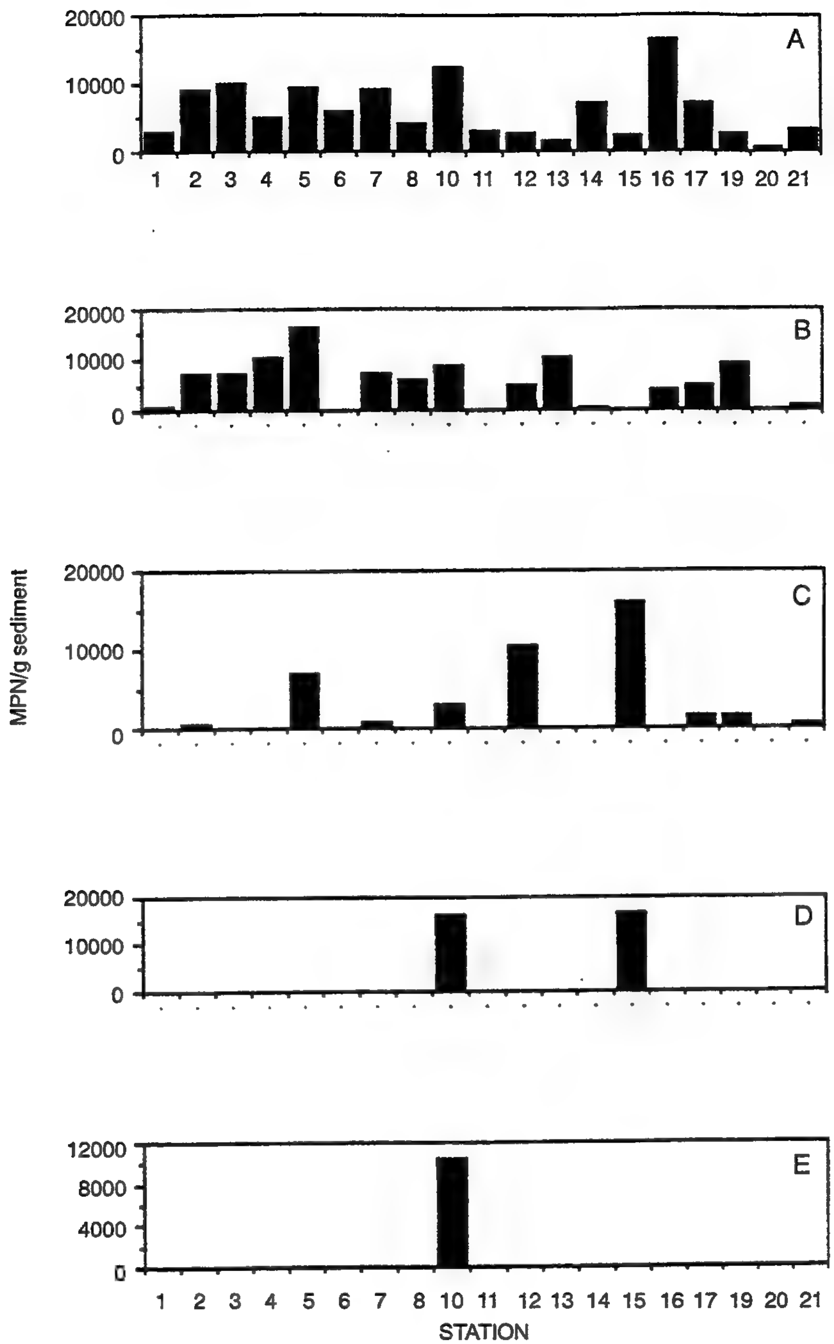

Figure 3-34. *C. perfringens* concentrations at different depths (A–E) in sediment cores from Portsmouth Harbor, September 1991.

3.6 HYDRODYNAMICS

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INTRODUCTION

The main objective of this component of the investigation was to obtain current data close to Seavey Island near the Jamaica Island Landfill. The measurement program was designed so that the current information could be used in the application of the hydrodynamic model DYNHYD3. Advective transport prediction from DYNHYD3 will then be used with TOXIWASP to address the question of how released substances make their way into the main Piscataqua channel (NCCOSC, et al., 1994).

In addition to new measurements, previous work was examined to acquire additional data relevant to transport near Seavey Island. Much has been published regarding the estuarine tidal dynamics of the Great Bay system as a whole (e.g., Swenson et al., 1977; Reichard and Celikkol, 1978). Swift and Brown (1983a, b) provide specific information of tidal transport in the Piscataqua channel adjacent to Seavey Island. Tidal harmonic constituents are given for a station in the main channel of the Piscataqua River southeast of Seavey Island Cross-section area and tidal prism information are also listed, which means these data can be used to infer cross-section average current along the Piscataqua River side of Seavey Island.

METHODS AND RESULTS

CURRENT MEASUREMENTS

Observations were made from the NH Department of Environmental Services research vessel, the Admiral Vose II. Ebb flow measurements were made on November 3, 1991, and flood measurements were made on November 11, 1991. Four stations were used, shown as ST1–ST4 on figure 3-35 which do not correspond to Portsmouth Harbor Stations 1–4 referred to in other sections of this document. Stations were chosen so that an understanding of transport on the Back Channel side of Seavey Island could be attained. This new current data set would then complement information from Swift and Brown (1983a,b) pertaining to the Piscataqua River side. The four stations were positioned to assess transport into the Clark Island inlet (ST1), between Seavey Island and Kittery Point (ST2), into Spruce Creek (ST3), and into the Back Channel north of Seavey Island (ST4). Since the volume rate of flow in the Back Channel is essentially maintained, current speed at other Back Channel locations can be inferred from the Station ST4 data as well.

Current profiles were measured sequentially at each station with an Endeco ducted impeller current meter. Three minutes of speed, direction, and pressure (depth) data were taken at each depth. Station positions were obtained by taking compass bearings on nearby landmarks.

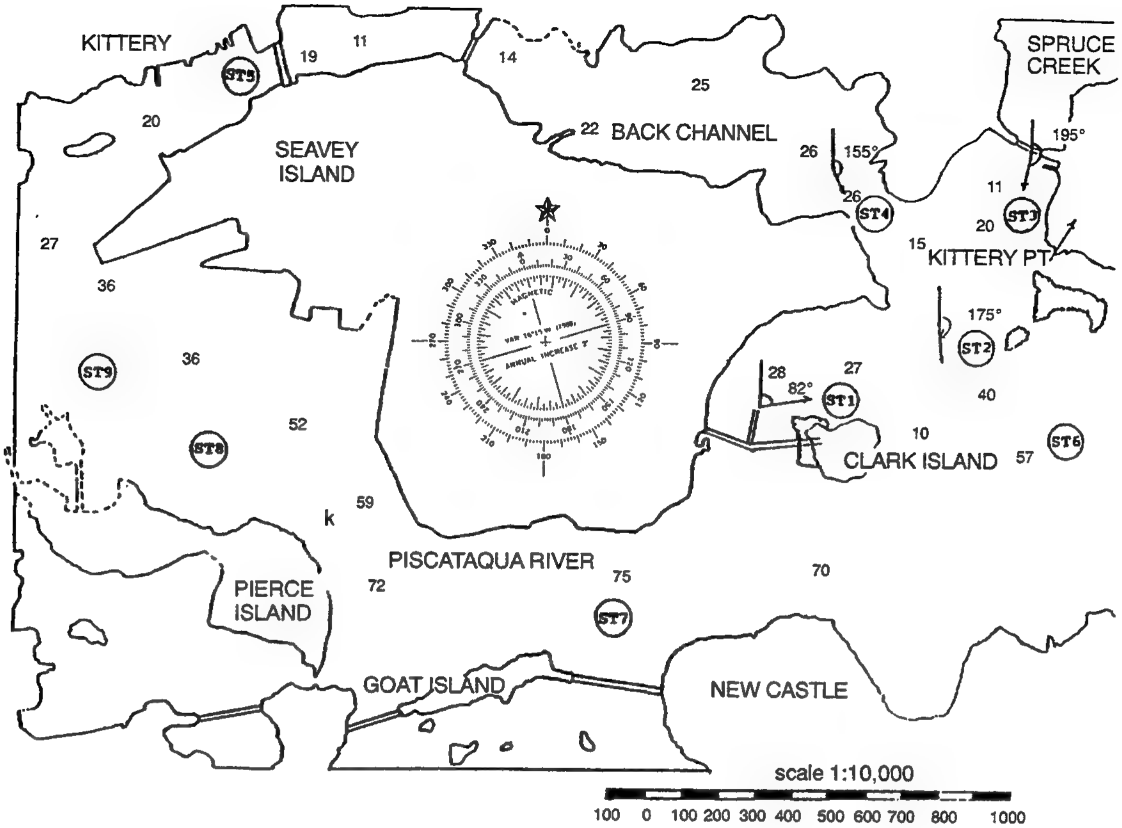


Figure 3-35. Current-meter deployment stations and channel axis directions. Channel depths are indicated in feet.

CURRENT MEASUREMENT PROCESSING

The first step was to evaluate the longitudinal component of current according to

$$U_l = |U| \cos(\theta_{cur} - \theta_{chan})$$

in which:

U_l = longitudinal component of current (component parallel to channel)

$|U|$ = current speed

θ_{cur} = current direction

θ_{chan} = channel direction

The channel axis directions are shown in figure 3-35. The positive direction is downriver.

Next the longitudinal component of current time series was time-averaged over 3-minute intervals. This time-averaged, longitudinal component of current data was corrected to average conditions in the spring-neap cycle by multiplying each current by average tide height divided by the height for the tide associated with the measurement. Results for each station are provided in tables 3-2 through 3-5. Current profile plots are shown in figures 3-36 through 3-39. Besides the actual date and time of measurement, time after low slack water (LSW) at Portsmouth Harbor Entrance is given in order to provide a common reference time. For consistency,

information is presented in the order determined by time after LSW. NOAA current tables were used to predict the occurrence of LSW at Portsmouth Harbor entrance.

Table 3-2. Longitudinal component of current at ST1.

Date	Time	Time After LSW[a]	Depth (m)	cm/s[b]
11/11/91	1048	0048	–3.78	–8.514
11/11/91	1048	0048	–6.46	2.132
11/11/91	1048	0048	–9.16	6.354
11/11/91	1234	0234	–2.69	16.657
11/11/91	1234	0234	–6.19	–1.333
11/11/91	1234	0234	–9.43	–14.216
11/11/91	1357	0357	–3.24	11.145
11/11/91	1357	0357	–6.19	–1.492
11/11/91	1357	0357	–8.90	–14.844
11/03/91	1248	0845	–2.42	1.005
11/03/91	1248	0845	–5.92	6.718
11/03/91	1248	0845	–7.80	8.626
11/03/91	1248	1033	–2.69	–3.901
11/03/91	1248	1033	–7.00	10.72
11/11/91	0919	1240	–3.31	–2.239
11/11/91	0919	1240	–5.94	6.912
11/11/91	0919	1240	–8.89	2.518

[a]At Portsmouth Harbor entrance.
[b]Longitudinal component of velocity.

Table 3-3. Longitudinal component of current at ST2.

Date	Time	Time After LSW[a]	Depth (m)	cm/s[b]
11/11/91	1117	0117	–3.78	–8.282
11/11/91	1117	0117	–6.19	–11.119
11/11/91	1117	0117	–9.16	–3.122
11/11/91	1417	0417	–3.51	–1.417
11/11/91	1417	0417	–6.19	–8.766
11/11/91	1417	0417	–8.90	–1.206
11/11/91	1454	0454	–2.42	–2.921
11/11/91	1454	0454	–4.85	6.782
11/11/91	1454	0454	–9.16	–9.928
11/11/91	1454	0454	–13.19	–11.996
11/03/91	1305	0910	–2.69	26.336
11/03/91	1305	0910	–5.12	27.826
11/03/91	1305	0910	–8.07	34.701
11/03/91	1305	0910	–11.31	7.878
11/03/91	1305	0910	–15.36	–5.029
11/03/91	1446	1051	–3.24	–5.028
11/03/91	1446	1051	–5.66	1.164
11/03/91	1446	1051	–8.90	11.021
11/11/91	0949	1210	–2.97	–11.705
11/11/91	0949	1210	–5.39	–14.782
11/11/91	0949	1210	–8.07	–1.527

[a]At Portsmouth Harbor entrance.
[b]Longitudinal component of velocity.

Table 3-4. Longitudinal component of current at ST3.

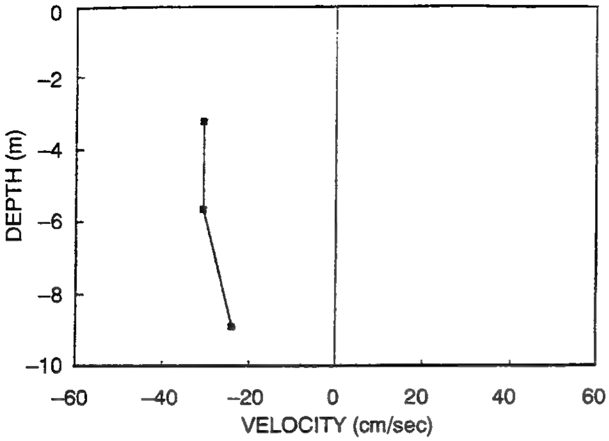
Date	Time	Time After LSW[a]	Depth (m)	cm/s[b]
11/11/91	1010	0010	–3.24	–30.737
11/11/91	1010	0010	–5.66	–30.792
11/11/91	1010	0010	–8.90	–24.095
11/11/91	1144	0144	–3.51	–2.771
11/11/91	1144	0144	–6.73	–9.898
11/11/91	1144	0144	–8.90	–15.436
11/11/91	1144	0144	–9.70	–18.654
11/11/91	1318	0318	–2.97	20.305
11/11/91	1318	0318	–6.19	–22.773
11/11/91	1318	0318	–8.34	–12.489
11/11/91	1439	0439	–2.97	40.309
11/11/91	1439	0439	–5.66	43.886
11/11/91	1439	0439	–8.90	34.599
11/03/91	1344	0949	–2.97	14.075
11/03/91	1344	0949	–5.92	–4.015
11/03/91	1344	0949	–7.80	–10.683
11/03/91	1506	1111	–3.24	0.629
11/03/91	1506	1111	–6.19	–2.053
11/03/91	1506	1111	–8.07	2.614

[a]At Portsmouth Harbor entrance.
[b]Longitudinal component of velocity.

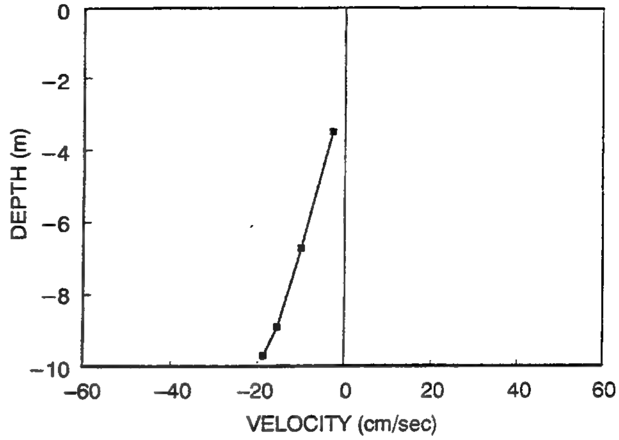
Table 3-5. Longitudinal component of current at ST4.

Date	Time	Time After LSW[a]	Depth (m)	cm/s[b]
11/11/91	1029	0029	–2.97	–32.173
11/11/91	1029	0029	–5.87	–36.700
11/11/91	1029	0029	–7.79	–32.205
11/11/91	1210	0210	–3.51	–42.453
11/11/91	1210	0210	–6.19	–55.315
11/11/91	1339	0339	–3.51	–28.600
11/11/91	1339	0339	–5.39	–44.982
11/11/91	1339	0339	–8.90	–41.632
11/11/91	1457	0457	–2.97	–16.051
11/11/91	1457	0457	–5.92	–21.636
11/11/91	1457	0457	–8.90	–29.919
11/11/91	1409	1014	–2.97	37.652
11/11/91	1409	1014	–5.66	28.505
11/03/91	1409	1014	–7.00	23.029
11/03/91	1525	1130	–2.97	19.183
11/03/91	1525	1130	–7.00	12.775

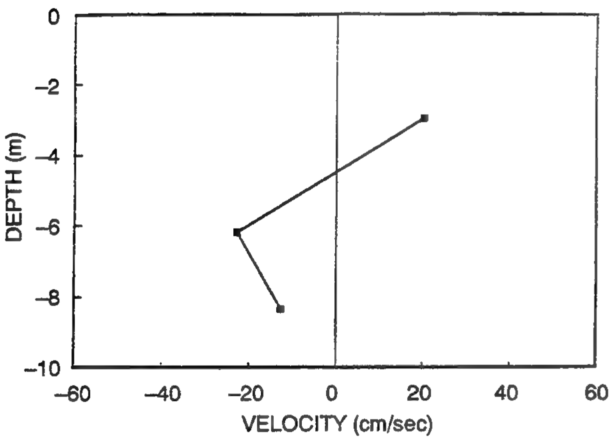
[a]At Portsmouth Harbor entrance.
[b]Longitudinal component of velocity.



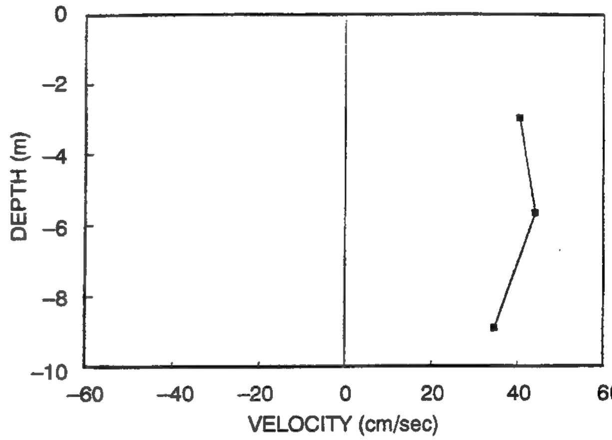
(a) 10 minutes after low slack water



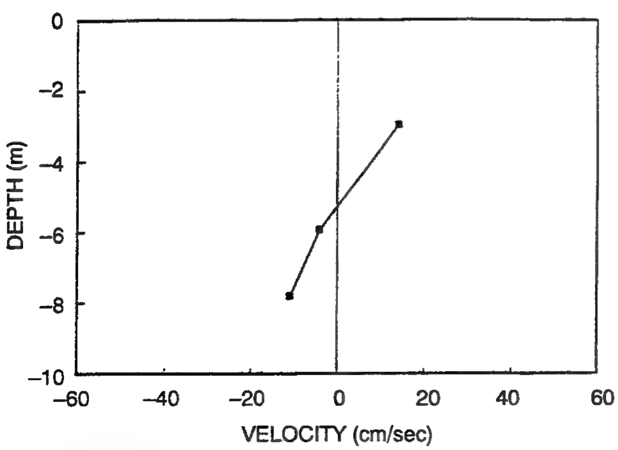
(b) 1 hour and 44 minutes after low slack water



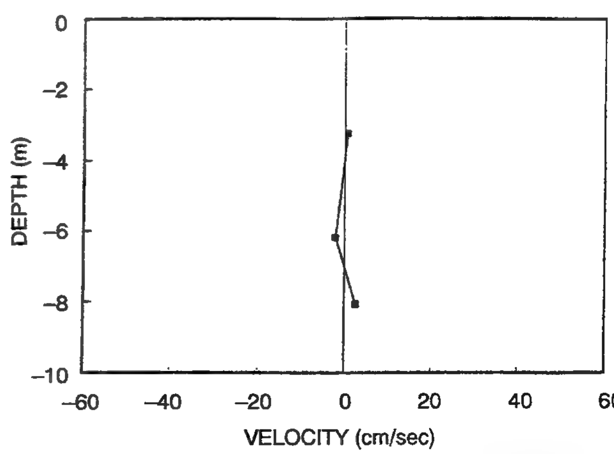
(c) 3 hours and 18 minutes after low slack water



(d) 4 hours and 39 minutes after low slack water

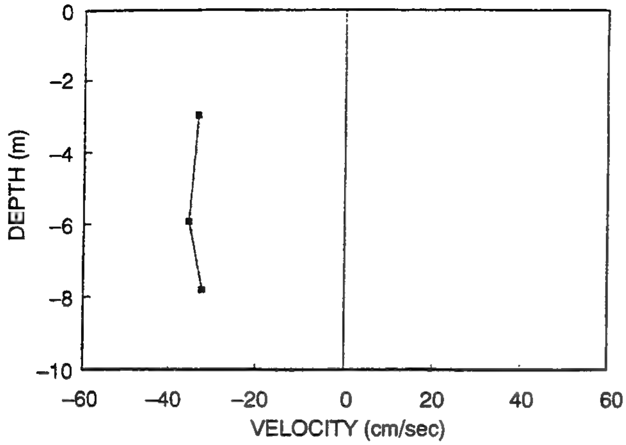


(e) 9 hours and 49 minutes after low slack water

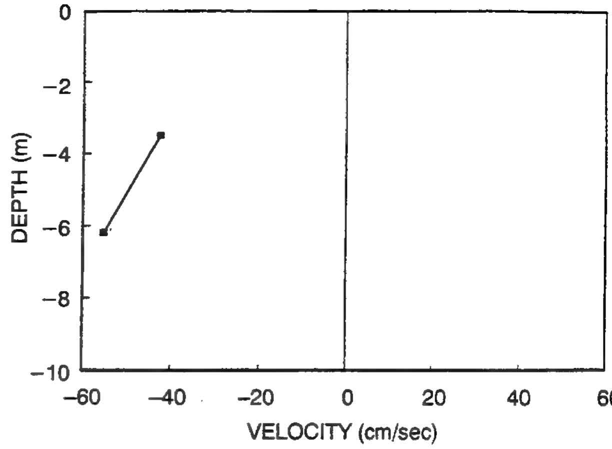


(f) 11 hours and 11 minutes after low slack water

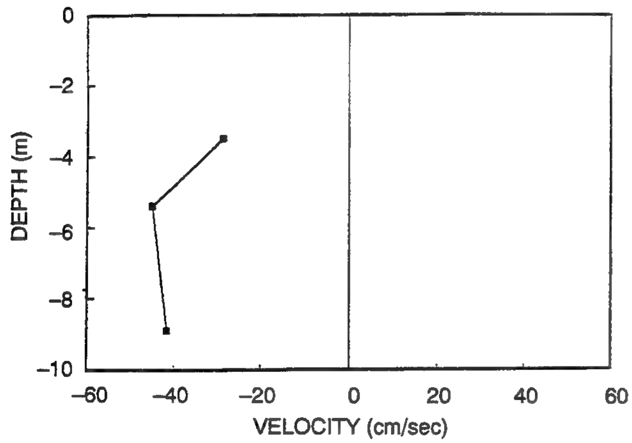
Figure 3-38. Station 3 longitudinal component of current after LSW at Portsmouth Harbor entrance on 11 November 1991



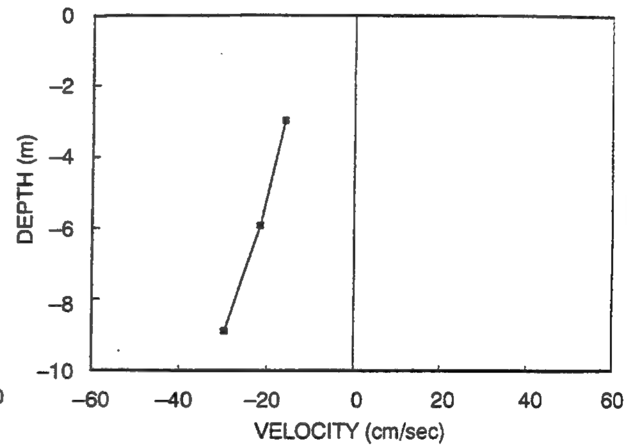
(a) 29 minutes after low slack water



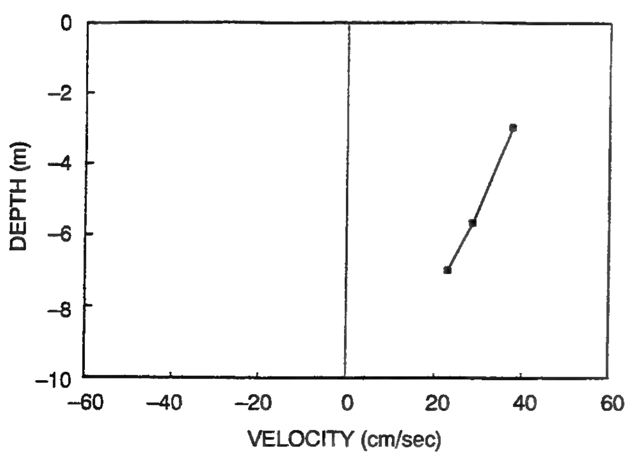
(b) 2 hours and 10 minutes after low slack water



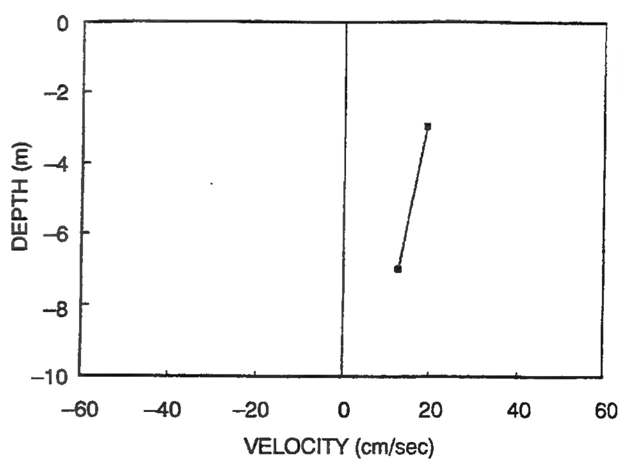
(c) 3 hours and 39 minutes after low slack water



(d) 4 hours and 57 minutes after low slack water



(e) 10 hours and 14 minutes after low slack water



(f) 11 hours and 30 minutes after low slack water

Figure 3-39. Station 4 longitudinal component of current after LSW at Portsmouth Harbor entrance on 11 November 1991.

Current profiles were vertically averaged. Depth-averaged current, as a function of time after low slack water at Portsmouth Harbor entrance, is shown for each station in figures 3-40a through 3-40d. Depth-averaged current was also inferred for a fifth station, ST5 (figure 3-40e), located in the Back Channel off the northwest side of Seavey Island (figure 3-35). The current was calculated assuming that the volume rate of flow through the Back Channel remained constant along the channel, though changing in time. Thus the depth-averaged current at Station ST5 was evaluated using Station ST4 data according to

$$(U_{da})_5 = (A_4/A_5) * (U_{da})_4$$

in which

$(U_{da})_{4,5}$ = depth-averaged current at Stations ST4, ST5

$A_{4,5}$ = channel cross-section area at Stations ST4, ST5

INFERENCES FROM PREVIOUSLY OBTAINED DATA

Longitudinal, cross-section averaged current was predicted for Station ST6 in the Piscataqua channel (figure 3-35). The calculation made use of the tidal harmonic constituents determined for that location (NOAA Station C104) by Swift and Brown (1983a,b). The computation for an average tide in the spring-neap cycle at ST6 is shown in figure 3-341a.

Results were also inferred for Stations ST7–ST9 along the Piscataqua channel side of Seavey Island (figure 3-35). These were calculated as

$$(U_{cs})_i = [(U_a)_i/(U_a)_6] * (U_{ca})_6$$

in which:

U_{cs} = cross-section-averaged current

U_a = tide-averaged current provided by Swift and Brown (1983b) from tidal prism and cross-section area considerations

U_{ca} = tide-averaged cross-section current for ST6 (from Swift and Brown, 1983b)

i = ST7, ST8, or ST9 according to station number

Results plotted over a tidal cycle are shown in figures 3-41b through 3-41d.

DISCUSSION

This data set will be used for calibrating and validating DYNHYD3. Some interpretation can, however, be made at this time based directly on the observations. The Clark Cove (ST1) measurements indicate that very little transport is taking place by depth-averaged current. This is because the cove is a closed embayment. Dispersion may, however, play a role in mixing released substances with the main system. The Hicks Pond (ST2) measurements are variable due probably to spatial and temporal changes associated with the flow splitting into several channels. The ECOS data set should be comprehensive enough to resolve current variability due to the complicated geometry (Chadwick, 1993). The ST3 observations suggest that Spruce Creek behaves as a small salt-wedge estuary. Flood occurs first at the bottom and ebb is seen first at the surface. Flow in the Back Channel and the Piscataqua River is characteristic of strong, well-mixed tidal transport.

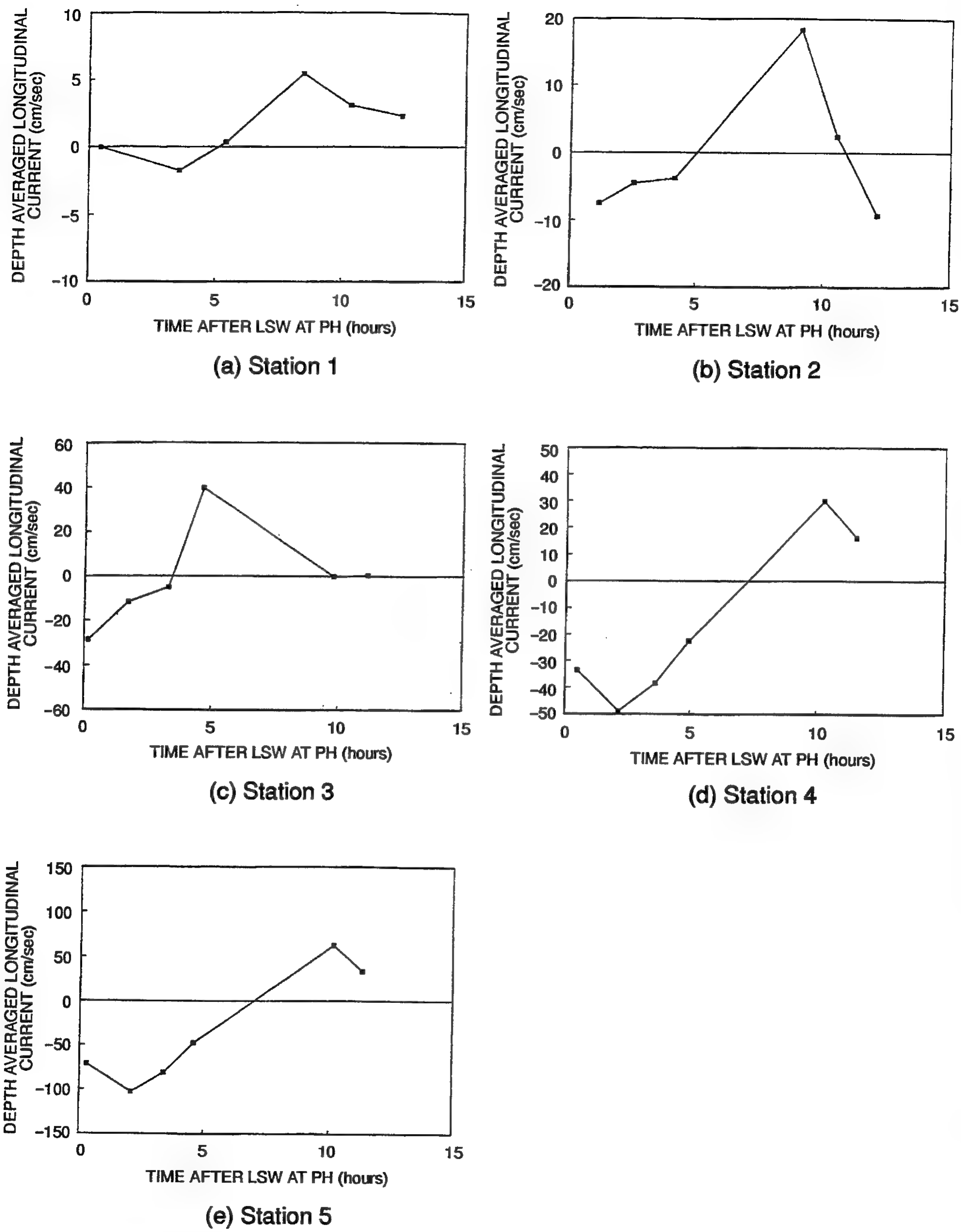


Figure 3-40. Depth-averaged, longitudinal component of current.

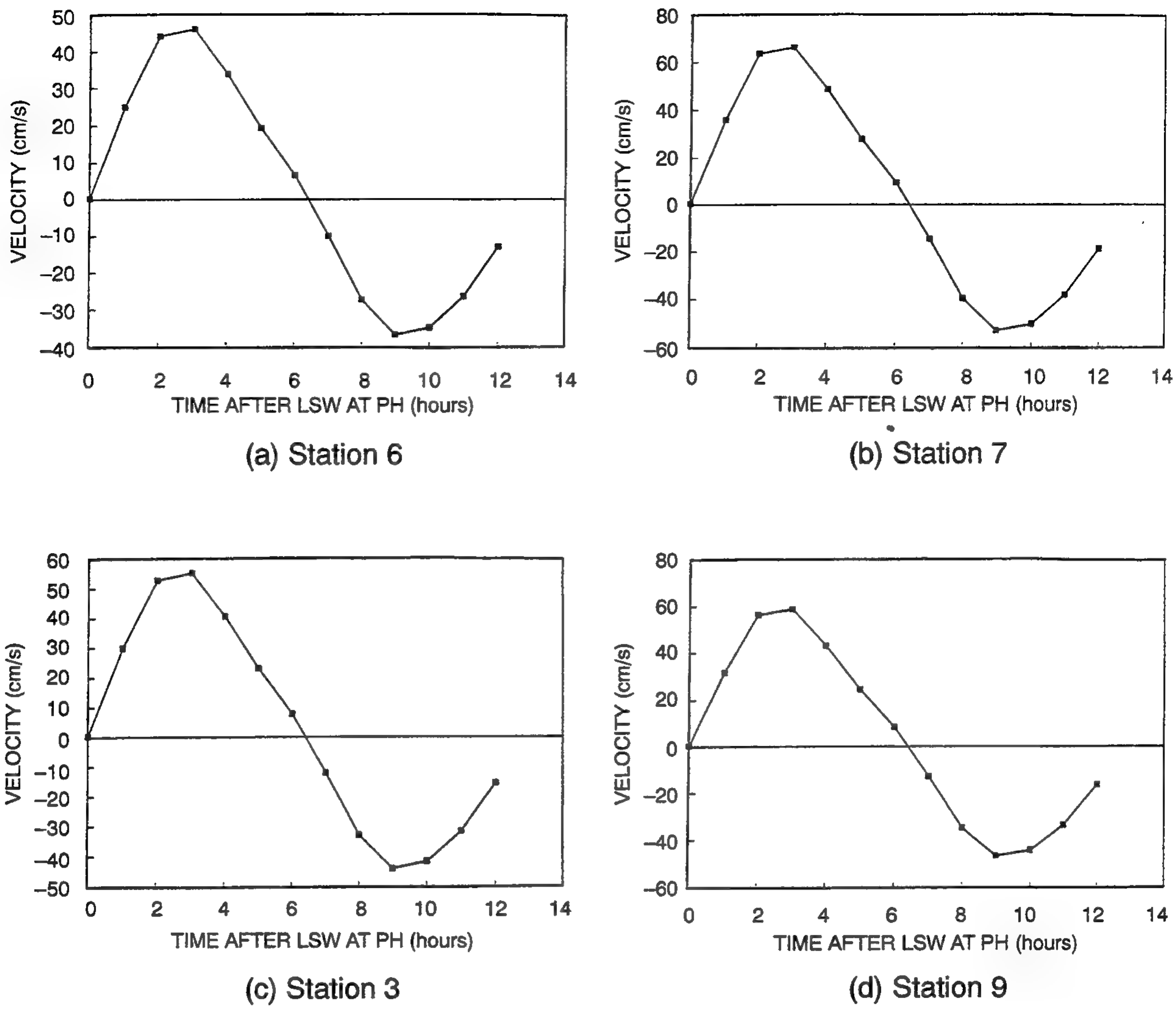


Figure 3-41. Cross-section-averaged current.

3.7 EELGRASS COLLECTION AND ANALYSIS

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INTRODUCTION

The abundance and distribution of eelgrass (*Zostera marina*) in the Great Bay Estuary has been studied since the early 1970s (Riggs and Fralick, 1975). Earlier discussions of eelgrass in Great Bay (Jackson, 1944) describe its extensive distribution within the entire estuary before 1930 and its decline and disappearance from the Bay during the early 1930s from the wasting disease. Jackson (1944) additionally describes the changes that occurred in Great Bay as a result of the extensive eelgrass loss, emphasizing the increase in the turbidity of the water, the disappearance of numerous fish species, and declines in waterfowl populations. Many natural resources within estuaries like Great Bay have subsequently been shown to depend heavily on the presence of viable eelgrass beds (Thayer et al., 1984). Additionally, the ability of seagrass beds to trap sediments from the water column, thereby creating improved water quality conditions, has now been documented (Short and Short, 1984).

The resources most closely associated with the distribution of eelgrass habitat have recently been reviewed for the Great Bay Estuary (Short, 1992). Within the last ten years, eelgrass distribution in Great Bay has shown a large degree of variability. Maps of eelgrass distribution for Great Bay in 1980 and 1981 showed extensive populations within Great Bay extending throughout Little Bay and along the New Hampshire side of the Piscataqua River (Nelson, 1981). Unfortunately, no records of eelgrass distribution on the Maine side of the Piscataqua River are available. Additionally, for all the records available on eelgrass distribution, no information could be found on the occurrence of eelgrass in Portsmouth Harbor or the area south of the Memorial Bridge on the Piscataqua River. Recent declines in eelgrass populations throughout the Estuary were documented between 1984 and 1988 (Short et al., 1986; Short, 1992). The dramatic declines in eelgrass populations over the last decade have again been identified to be caused by eelgrass wasting disease (Short et al., 1987; Short et al., 1988). The organism responsible for causing the wasting disease has now been identified as *Labyrinthula zosterae* (Muehlstein et al., 1991). It is not expected that potential contaminants from the Shipyard would affect the wasting disease, but it is important to separate the wasting disease from other causes of eelgrass demise.

Ongoing studies of eelgrass in the Great Bay Estuary (National Oceanic and Atmospheric Administration Coastal Ocean Program (NOAA-COP) research) are examining the plant's year-to-year variation in distribution within Great Bay and Little Bay and the activity of the wasting disease within the Estuary. The study reported here extends the previous bounds of eelgrass observations to include areas of Portsmouth Harbor and the lower Piscataqua River on both the Maine and New Hampshire sides of the Estuary. Additionally, sampling was undertaken in the York River, ME, as a control site representing an unindustrialized area. Nationwide, eelgrass populations are declining at a rapid rate, primarily as the result of pollution in addition to disease outbreaks in some locations. The importance of these vegetated bottom habitats is becoming evident, and a major national effort is now underway to conserve and restore eelgrass

habitats. In fact, this is a primary initiative of NOAA-COP, begun in 1990. In the present study, eelgrass samples were collected for the analysis of metal contamination to assess the plant's bioaccumulation potential.

METHODS

Eelgrass was collected at nine stations in the Great Bay Estuary (figure 3-42) as well as twelve stations in Portsmouth Harbor and two stations in the York River (figure 3-43). The quantitative collection of above- and below-ground eelgrass samples within the Estuary was conducted according to methods described in UNH-JEL SOP 1.01 (Mueller et al., 1992). A remote sampling technique was developed to minimize contact between sample collectors and the potentially contaminated mud and tissue. With a proper sampling technique, and with modified oyster tongs set to a fixed opening, 1/16-m^2 samples were effectively collected with no threat of hazardous contamination to the researchers involved. In August and September 1991, eelgrass samples were collected from twelve stations in Portsmouth Harbor between the I-95 Bridge and the Coast Guard Station at New Castle and two control stations in York Harbor (figure 3-43). Additionally, nine stations were sampled within the inner part of the Great Bay Estuary extending from above the Memorial Bridge to the confluence of the Lamprey and Squamscott Rivers within Great Bay (figure 3-42). Many of these sites were the same as those used in previous monitoring programs of eelgrass abundance for the Great Bay National Estuarine Research Reserve and a project currently funded through NOAA-COP.

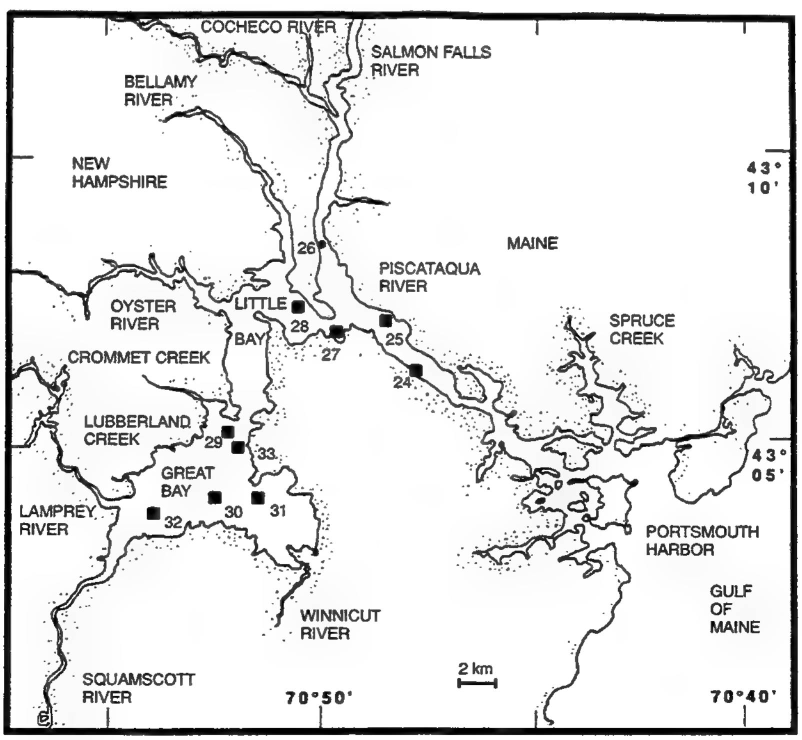

Figure 3-42. Map of the Great Bay Estuary showing the location of sampling stations. Squares denote eelgrass stations.

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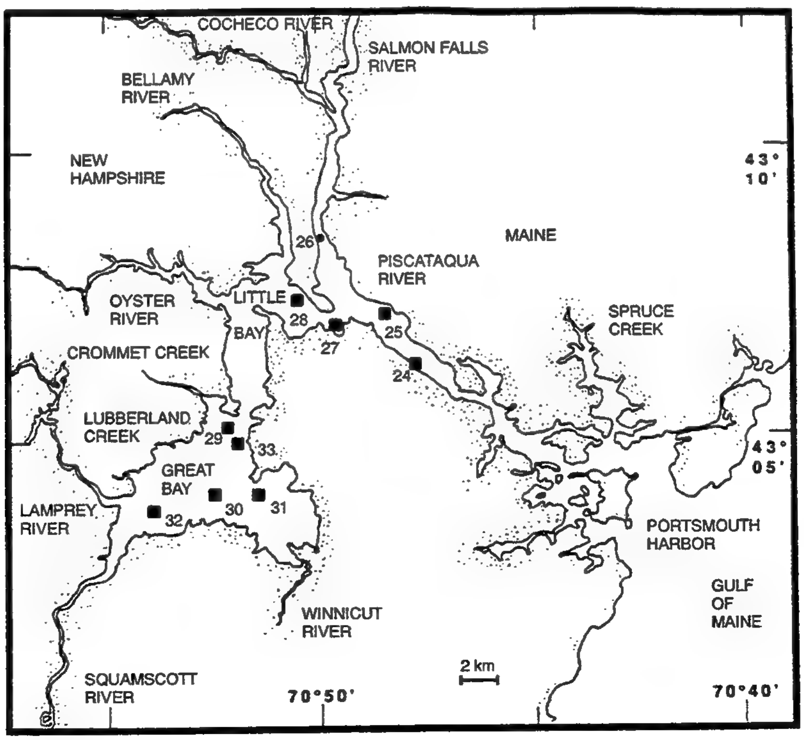

Figure 3-42. Map of the Great Bay Estuary showing the location of sampling stations. Squares denote eelgrass stations.

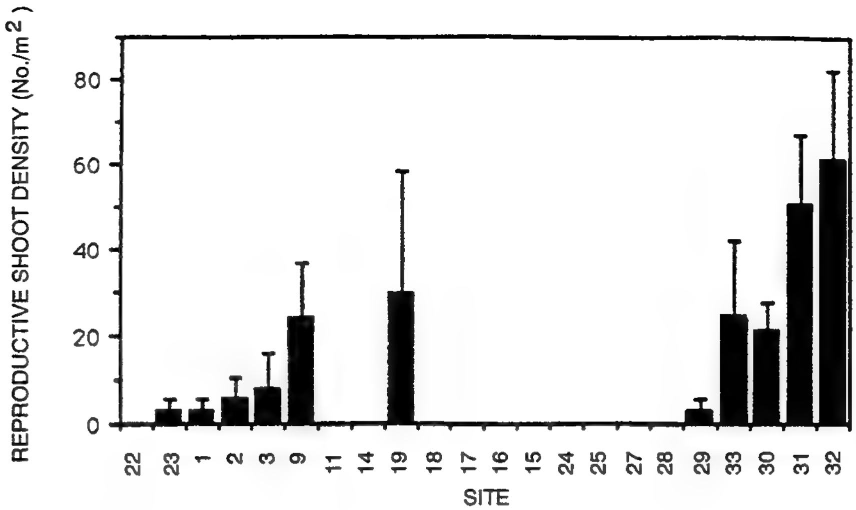

Figure 3-46. Eelgrass reproductive shoot density in the York River (22, 23), Portsmouth Harbor (1–19), and up the Great Bay Estuary (24–33).

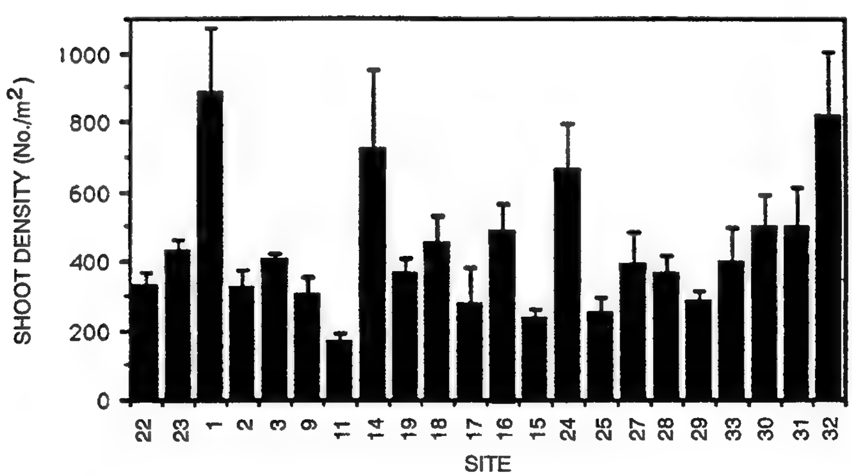

Figure 3-47. Eelgrass vegetative shoot density in the York River (22, 23), Portsmouth Harbor (1–19), and up the Great Bay Estuary (24–33).

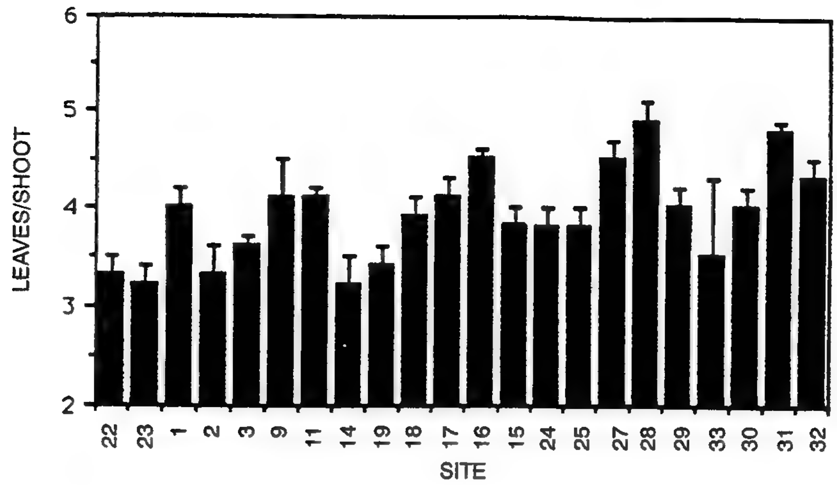

Figure 3-48. Number of leaves per eelgrass shoot in the York River (22, 23), Portsmouth Harbor (1–19), and up the Great Bay Estuary (24–33).

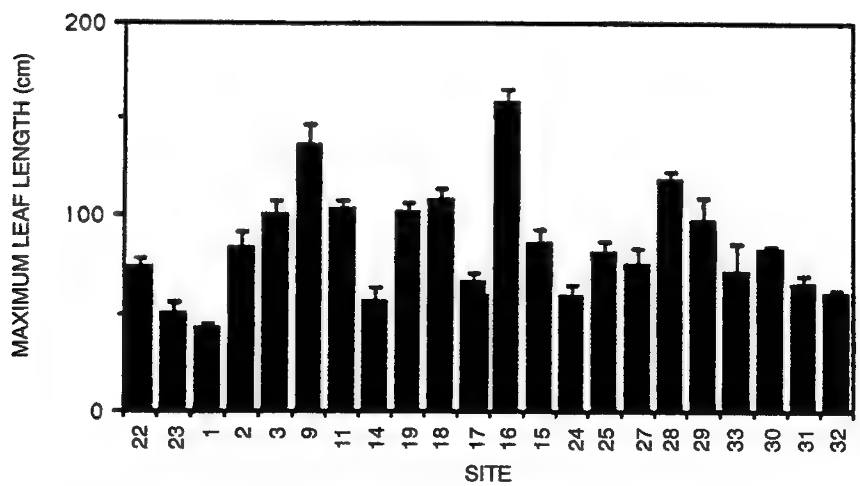

Figure 3-49. Eelgrass maximum leaf length in the York River (22, 23), Portsmouth Harbor (1–19), and up the Great Bay Estuary (24–33).

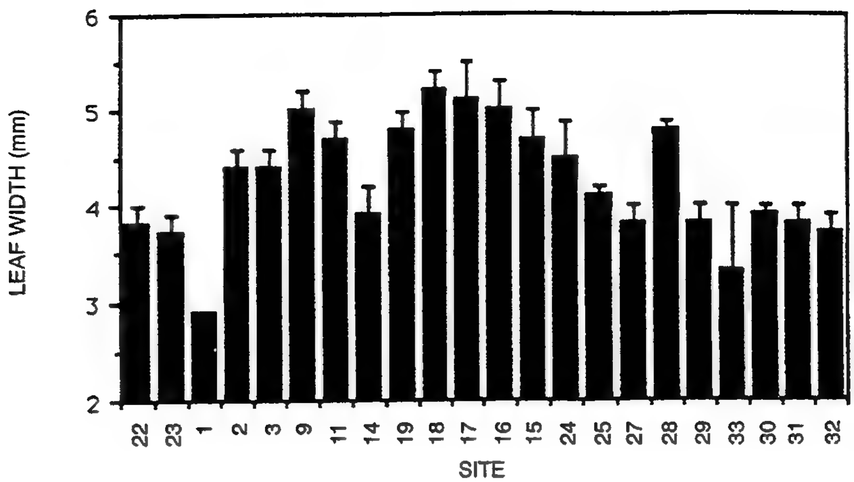

Figure 3-50. Eelgrass average leaf width in the York River (22, 23), Portsmouth Harbor (1–19), and up the Great Bay Estuary (24–33).

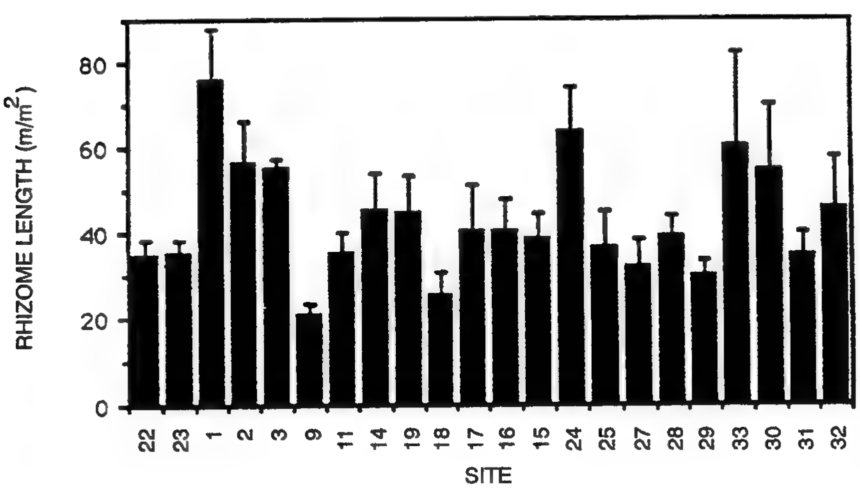

Figure 3-51. Eelgrass rhizome length in the York River (22, 23), Portsmouth Harbor (1–19), and up the Great Bay Estuary (24–33).

DISCUSSION

Eelgrass biomass in this study showed the same general trend seen previously (Short et al., 1986) of increased biomass in the lower portions of the Estuary. This general trend seems to hold for all stations except those adjacent to high current velocity areas near the main channel and the intertidal Station 1. Some of the healthiest, most abundant eelgrass beds were found in the vicinity of Seavey Island, and sites in Little Bay and Great Bay had significantly lower biomass than sites in Portsmouth Harbor. The biomass data from the August/September 1991 sampling (Appendix F), which is the season of peak biomass, were higher than maximum biomasses observed at stations during previous years. Within Clark Cove (Stations 3–8), eelgrass was found only at Station 3, although the other areas appear to be suitable eelgrass habitat.

The development of reproductive shoots and flowers was found to be greater in the upper Estuary in Great Bay than in Little Bay or the Piscataqua River, with some reproduction in the Portsmouth Harbor area. In fact, the major area of flowering observed in the lower Estuary was the high-current site Station 9.

3.8 FUCOID COLLECTION AND ANALYSIS

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INTRODUCTION

Some seaweeds, like the Fucalean brown algae *Ascophyllum* and *Fucus*, may concentrate diverse pollutants (e.g., heavy metals) within their vegetative and reproductive tissues because they are unable to regulate the uptake or release of these substances (Munda, 1986). Thus, fucoid algae may be able to integrate long-term fluctuations of pollutant levels. In describing accumulation patterns in fucoid algae, Munda (1986) notes that pollutants may also be differentially concentrated within fertile receptacular versus vegetative tissues. Such physiological traits of fucoid algae, coupled with their ubiquitous estuarine distributions (Mathieson and Hehre, 1986), make them valuable tools for monitoring pollutants. The comparative monitoring of several benthic plants (*Ascophyllum nodosum* in addition to eelgrass, *Zostera marina*) may reveal these plants to have considerable potential as indicators of pollution in such diverse ecological niches as intertidal versus subtidal, rocky versus muddy substrata, and passive versus selective uptake.

This report gives an initial evaluation of the distribution and abundance patterns of conspicuous fucoid brown alga *Ascophyllum nodosum* (the knobbed wrack) within the lower reaches of the Piscataqua River (i.e., near the Shipyard) and the York River to compare major spatial patterns. Samples of *A. nodosum* tissues were also analyzed for several pollutants (see Chapter 3.13).

METHODS

An initial assessment of the distribution and biomass patterns of epibenthic populations of *Ascophyllum nodosum* was made near the Shipyard according to procedures described in JEL SOP 1.03 (Mueller et al., 1992). That is, destructive biomass samples of the mid-intertidal populations of *A. nodosum* were taken at seven sites surrounding the Shipyard (i.e., Stations 3, 8, 9, 10, 10a, 17, and 19), as well as at one reference site within the York River, Station 22 (figure 3-52). All samples were obtained on foot during low tides from rocky mid-intertidal substrata, with each sample having at least some conspicuous *Ascophyllum* populations. A 0.0625-m^2 quadrat frame was positioned in the middle of the *Ascophyllum* zone at each site; all the contents within each quadrat were harvested with a putty knife and put into individually labelled bags. Six replicate quadrats were harvested at each station. Upon arrival at the laboratory, the samples were refrigerated at 5°C for approximately one week before being processed. All the plant and animal materials within each quadrat were separated and cleaned and their biomass was determined as damp-dried weight. *Ascophyllum*'s damp-dried biomass data were converted to dry weight by drying a 250-gram sample from each quadrat at 105°C for 48 hours and calculating the wet-weight to dry-weight ratio. Specific details regarding collection sites and dates plus a compilation of wet weight to dry weight are reported in Appendix G. In figure 3-53, the biomass of *Ascophyllum* populations at the eight sites is expressed as g dry weight/m^2.

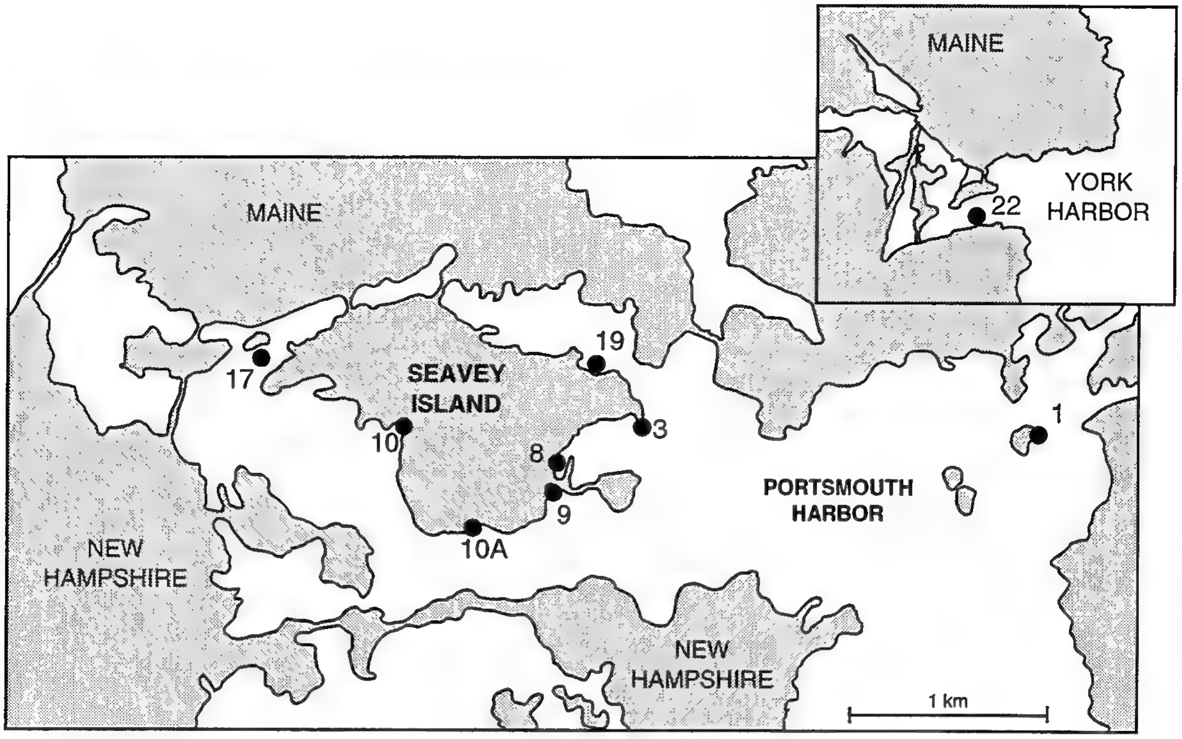

Figure 3-52. Portsmouth Harbor and York River *Ascophyllum* sampling locations.

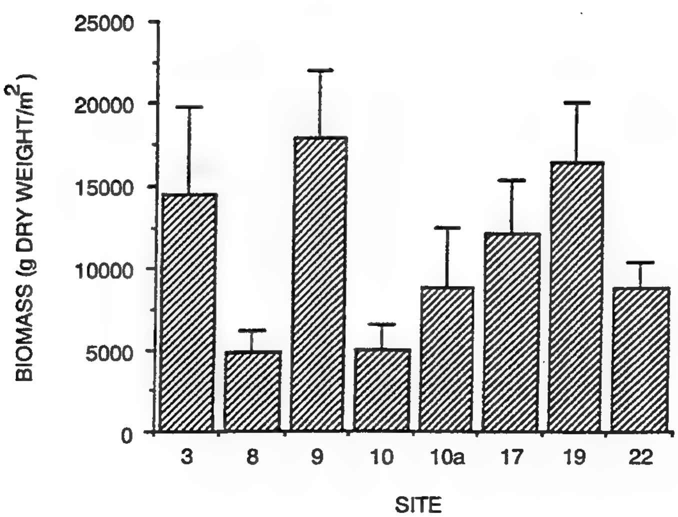

Figure 3-53. *Ascophyllum* biomass at Portsmouth Harbor and York River stations.

RESULTS AND DISCUSSION

As shown in figure 3-53, there was substantial variability of *Ascophyllum* biomass at the eight sites. The plant's maximum biomass, based on dry weight, was recorded at Stations 3 (3,623 g/m^2), 9 (4,461 g/m^2), and 19 (4,102 g/m^2), while its lowest standing stocks were found at Stations 8 (1,219 g/m^2) and 10 (1,239 g/m^2). There was an increase in standing stock from Stations 10 to 19 (figure 3-52). The biomass at the single York River site, Station 22, was intermediate (2,216 g/m^2) to the extremes found for the lower reaches of the Piscataqua River.

In interpreting such variable patterns of standing crop, several generalizations regarding the ecology of *Ascophyllum* should be noted. *Ascophyllum* grows best on firm rocky substrata, while its stature and biomass are maximal in calm locations (Sharp, 1987). The pronounced variability of *Ascophyllum*'s biomass is caused, at least in part, by spatial variability of tidal current regimes within this section of the Piscataqua River (Mathieson et al., 1983; Mathieson et al., 1991). Rocky promontories exposed to strong tidal currents have diminutive populations of the knobbed wrack, while adjacent back-eddy areas have extensive populations. Besides obvious differences in current velocities, substrate angle may also be important, as many of the original horizontal surfaces near the Shipyard have been transformed to vertical walls that are impacted by strong currents. Comments regarding pollutants would be premature before an evaluation of the tissue samples. Ultimately, in evaluating reasons for the spatial patterns noted, particular emphasis should be placed upon the amount of pollutant loading and the occurrence of diminutive *Ascophyllum* populations within sheltered habitats. A comparison of biomass patterns for *Ascophyllum and Zostera marina* has also been made in relation to the distribution of contaminants in these species (see Section 4).

3.9 FLOUNDER AND LOBSTER COLLECTION AND ANALYSIS

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INTRODUCTION

During the early 1800s, pollution and excessive sedimentation from the rapid development of the seacoast region adversely affected most commercial and recreational fishing stocks in Great Bay (Jackson, 1922; Jackson, 1944; Warfel et al., 1942; Krochmal, 1949). Nonetheless, many fisheries have reestablished themselves since 1900. Fifty-two species of fish supported by the estuary include populations of commercially and recreationally important resident and migratory fish species such as winter flounder (*Pseudopleuronectes americanus*) and smooth flounder (*Liopsetta putnami*). These two species of flounder account for 14% of the total recreational catch of Great Bay during the warmer months (NHFG, 1988). Lobsters (*Homarus americanus*) are found in Great Bay, Little Bay, and the Piscataqua River (Nelson, 1981) and migrate up the estuary in the spring and back down in fall (Win Watson, UNH, personal communication). Lobsters are the subject of recreational trapping throughout the estuary. Commercial lobstering occurs within the estuary and to a limited extent within the main channel of Great Bay. Lobster and flounder are both significant resources in the Great Bay Estuary and are of special interest in a study of possible contamination because of their potential human health risk.

Since the 1970s, flounder have been collected in the estuary for several studies. Monitoring studies within the Great Bay Estuary conducted in the 1970s found that dominant resident fish species in the shallow waters of Great Bay included winter and smooth flounder. Winter flounder was one of four consistently abundant species at the deeper site (NAI, 1979). Normandeau Associates (1979) found consistent catches of smooth and winter flounder in Cutts Cove over a 17-year period. In an inventory of natural resources of the Great Bay Estuary, fish were collected with beach seines, gill nets, and trawls from July 1980 to October 1981 (Nelson, 1981; Nelson, 1982). Smooth and winter flounder occurred in shallow sites, although they were not the most abundant of all the fish found. In deeper waters, winter flounder were among the most abundant. The estimated catch for flounder taken in New Hampshire waters by rod and reel from bridges, piers, and jetties decreased dramatically during the 1980s for reasons that are not clear (Short, 1992).

More recent work includes a June-to-September survey in 1990 of two eelgrass beds in Great Bay that produced only one winter flounder (Sale et al., 1992). A few smooth and winter flounder were also collected in surveys of a Great Bay salt marsh creek from May to November 1990 (Sale et al., 1992). A number of current studies are assessing larval and juvenile fish ecology within nursery habitats of Great Bay, including research by New Hampshire Fish and Game and the UNH Zoology Departments on the effect of different estuarine habitats on the feeding ecology of winter and smooth flounder.

Bellmer (1985) reports a survey of lobsters in the Piscataqua River conducted by the Army Corps of Engineers sighted 221 lobsters over 4100 m^2 ($0.05/m^2$). In 1987, Normandeau Associates conducted a study in the subtidal areas of Outer Cutts Cove (NAI, 1987). They found lobster along four transects, with a density of $0.04/m^2$. Lobster were most abundant along the

shipping channel. Both the average and maximum densities of lobster in Cutts Cove were lower than in the Army Corps of Engineers study. Kimball Chase reported finding lobster in the same subtidal habitat studied by NAI (Kimball Chase, Balsam, and RKG, 1990).

Work completed in Great Bay provides an excellent database on the species of fish using the estuary, the life stages present, and the times of year they are found (NAI, 1979; Nelson, 1981; Sale et al., 1992; Howell and Armstrong, unpublished). However, no comparable data exist for lobsters. Little information exists on the role the estuary plays in supplying fish and lobsters to coastal stocks or on the movement of fish and lobster through the estuary. Our study describes flounder and lobster populations in the lower portion of the estuary near Portsmouth Harbor and at control stations at the mouth of York River.

METHODS

Founder and lobster populations in the lower Piscataqua and York Rivers were sampled by NAI along transects at nine stations (figure 3-54) between 25 and 27 September 1991. Sampling areas included the mouth of York River (near Station 22), Portsmouth Harbor near Gooseberry and Fishing Islands in Pepperrell Cove (near Station 1), between the US Coast Guard station piers (Station 2), around Seavey Island (Clark Cove Stations 3–8, Back Channel Station 19, and drydocks Station 12), and upriver on the New Hampshire side of the Route 1 bypass bridge in outer Cutts Cove (Station 15) (NAI, 1992).

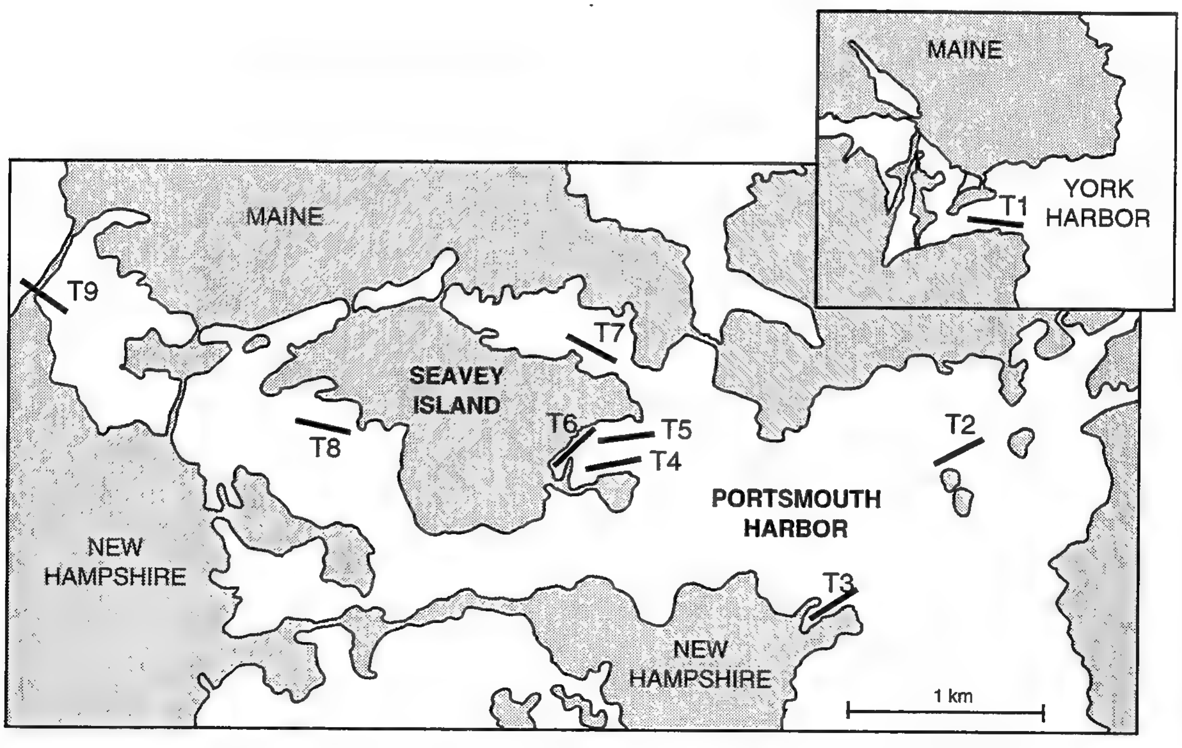

Figure 3-54. Location of flounder and lobster otter trawl transects.

An assessment was made of size, abundance, and pathologic condition of flounder, and tissue samples were collected for chemical analysis. Flounder were collected by otter trawl with three 5-minute tows conducted at each station according to procedures described by JEL SOP 1.13

(Mueller et al., 1992). When possible, one sample of flounder flesh (300 grams) and 50 grams of flounder liver were retained at each station, but insufficient fish tissue was available to archive samples. Samples were dissected in the field and placed in labelled whirlpack bags, kept on ice in the dark, and frozen upon return to shore. Occasionally several extra tows had to be taken in an attempt to collect any flounder at all (NAI, 1992).

Lobsters were sampled by NAI during the same sampling trawls described above for founder (NAI, 1992). When possible, one sample of lobster tail (300 grams) and 25–50 grams of hepatopancreas were retained at each station. Again, no archive samples were collected. Samples were dissected in the field and placed in labelled whirlpack bags, kept on ice in the dark, and frozen upon return to shore (NAI, 1992).

All data from the lobster and flounder trawls are presented in Appendix H. Flounder showed a sparse distribution among the stations, with the greatest densities found at Stations T2, T5, and T6 (figure 3-55). The largest flounder, with a mean length of 275 mm, were found at the upper estuary site (Station 9) (figure 3-55). Generally flounder size increased moving up the estuary. No flounder lengths were reported for Station T2 because measurements were not taken.

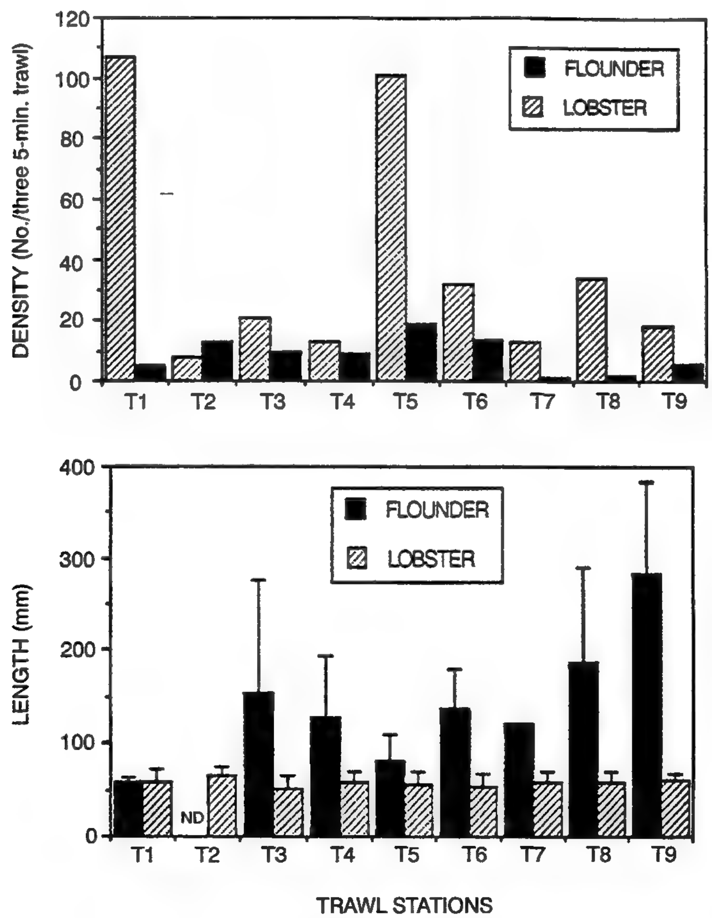

Figure 3-55. Average density and length of flounder and lobster collected by trawl from Station T1 in York Harbor and Stations T2 through T9 in Portsmouth Harbor. Error bars represent standard deviation.

Lobster density varied among the stations, with the most lobster found in York River and Clark Cove (Stations T1 and T5) (figure 3-55). Lobsters showed consistent mean carapace lengths of ~60 mm among the nine stations (figure 3-55). Station T2 had slightly larger mean lobster size (3.25 inches or 82.5 mm), but the size was still well below the legal limit for lobster fishing.

DISCUSSION

The flounder collected in the Portsmouth Harbor area were small in size, suggesting either that the time of sampling required for the Shipyard project was not optimal for collecting large animals or that, compared to earlier times, adult populations are reduced in abundance in the estuary.

The large numbers of small lobsters suggest that recruitment was important in the estuary. During the sampling for eelgrass biomass (see Section 3.7), juvenile lobsters were collected at several stations. These small lobsters were inhabiting underground borrows within the eelgrass beds and occurred at densities as high as 8/m^2. The discovery of eelgrass beds as a new habitat for lobster nurseries is of major importance and requires future studies.

3.10 MUSSEL COLLECTION AND ANALYSIS

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INTRODUCTION

Mytilus edulis L., the blue mussel, is the dominant bivalve commonly found along the northeastern coast of the US (Menge, 1976). As sessile filter feeders, mussels are inherently subject to bioaccumulating chemical compounds from the water column through time (Fossato and Siviero, 1974; Phillips, 1976). Contaminants such as pesticides, organic hydrocarbons, and heavy metals may be present in particulate matter ingested by the bivalve or dissolved in the water column and filtered through the gills of the bivalve. Because mussels are tolerant of a broad range of environmental changes (e.g., temperature, salinity, and oxygen levels (Bayne, 1976)) and much is known of their physiological, histological, and biochemical characteristics, they are highly useful as biological indicators of marine pollution (Viarengo and Canes, 1991). Although the concentration levels of toxins in bivalve tissues may be considerably higher than such levels in the surrounding water because of accumulation, sampling in-situ mussels may be of use in tracing the area of dispersed toxins from a known source. By determining size frequency distributions and population condition indices of mussels (number live to number dead; number live to shell volume; shell length to meat weight and meat wet weight to dry weight), variations in tissue toxicological information may be compared to variations in biometrical dynamics.

In the Great Bay Estuary, blue mussels are found from the mouth of the Portsmouth Harbor up the Piscatiqua River to Little Bay (Nelson et al., 1981). Mussels appear on rock surfaces, seaweeds, wharf pilings, buoys, mud flats, subtidally, and within some eelgrass beds. According to Nelson et al. (1981), the size classes of mussels range from the 0.0–9.9-mm class to the 60.0–69.0-mm class. The mode of length was 30.0–39.9 mm. Adult densities ranged from 0 to 100/m^2 and juveniles were as dense as 675.5/m^2, although size differences between juveniles and adults were not distinguished.

Isaza et al. (1989) found the following metals and organics in mussel tissue collected from the Great Bay Estuarine system: 0.29–0.56 µg/g Cd; 0.6–1.1 µg/g Cr; 1.1–1.7 µg/g Cu; 0.7–1.0 µg/g Ni; 0.84–1.5 µg/g Pb; 13–34 µg/g Zn; 0.018–0.044 µg/g PCBs; and 0.22–11.0 µg/g PAHs. Any presence of Hg was below the detection limit of 0.03 µg/g. Of the sites where Isaza et al. (1989) collected mussels, the following locations were analogous to stations 2, 3–9, 19, 14, GBE4, and GBE5, respectively of the current project: Fort Point, Clark Cove, Jamaica Island, Pierce's Island, Hilton State Park, and Fox Point.

METHODS

Mytilus edulis were collected at 21 stations in Portsmouth Harbor, two in York River, and seven in the upper Great Bay Estuary (see figures 2-7 and 2-8). Collection and processing techniques are described in the JEL SOP 1.04 (Mueller et al., 1992). Subsamples of 10 mussels were selected randomly by successively dividing each sample in half until 10 individuals

remained. From the resulting 100 mussels, 30 were selected by choosing a number between 1 and 10, e.g., 4, and keeping every fourth (the number chosen) mussel counted from the 100 until 30 were selected.

Data were tested for normality. If data showed heterogeneous distributions, they were log-transformed. An ANOVA was calculated to determine if there were differences between stations. Once ANOVA's were run, models with significant F-ratios and P-values were tested by the *post hoc* Fisher's Protected LSD at the 0.01 level.

RESULTS

Thirty sites were sampled for mussels or oysters within 2 hours of low tide during September and October 1991 (Appendix I). In addition to tissue sampling for chemical analysis, biometrical data were determined from mussels collected at 23 of the 30 sites (Appendix I).

Mussel densities varied between sites, with the highest densities being at Stations 21, 9, 10a, and 14 in Portsmouth Harbor, Station 22 in the York River, and Stations GBE4 and GBE5 in the upper estuary (figure 3-56). All other sites had less than 1000/m^2, and half of these sites had less than 500/m^2. Stations 10a and 23 had the most dead mussels (>1000/m^2); all but Stations 14, 21, 23, and GBE2 had less than 500/m^2. Mussel lengths ranged between 3.3 and 5.2 cm, with the smallest mean sizes being located at Stations 22, 21, and 10a (figure 3-57). The mode of mussel lengths were 3.5–5.5 cm, with a mode of 5.5 cm at the mouth of the Portsmouth Harbor and York River sites (figure 3-58a), 3.5–4 cm within the Clark Island embayment (figure 3-58b), 5 cm along the main and back channels around Seavey Island (figure 3-58c), and 4.50–5 cm along the upriver sites (figure 3-58d). The lowest mean wet weight (<1.5 grams) of mussels occurred at Stations 22, 21, 10a, and 14 (figure 3-59). All other sites ranged from 1.5–3.2 grams. Likewise, the lowest mean dry weights (<0.2 g) were from mussels located at Stations 22, 21, 10a, 11, 14, GBE2, and GBE4 (figure 3-60). All other dry weights were >0.2 gram, with mussels from Stations 23, 1, and 7 being >0.4 gram. Stations 9 and 14 had the greatest mean shell volumes (>15 l/m^2), whereas shell volumes from the other sites were <10 l/m^2, with the smallest being from Stations 3, 4, 5, 6 and GBE1 (figure 3-61).

The overall condition of the mussel populations that were sampled is presented in a series of indices as ratios. First, the ratio of the number live to the number dead per site was determined. Stations 9 and 18 had the highest ratio of all sites (figure 3-62). Stations 22, 23, 11, and 17 had low live-to-dead ratios. The second ratio, mussel lengths (cm) to wet weights (grams), was fairly stable between sites except for Stations 21, 10a, and 14, which had higher ratios than the other sites (figure 3-63). The third ratio, number live to shell volume, was also consistent among sites except for Stations 22, 10a and 21, which were all higher than the other site ratios (figure 3-64). The final condition ratio, dry weight (grams) to shell volume (L/m^2), yielded high ratios at most sites except for Stations 22, 21, 9, 10a, and 14 (figure 3-65), although no statistical comparisons can be made.

A summary of the statistical analysis is listed in table 3-6. All dependent variables were tested by station and all models had significant F-ratios and P-values except length to dry weight. Number live, number dead, shell volume, and number live to shell volume all had significant r-squared values.

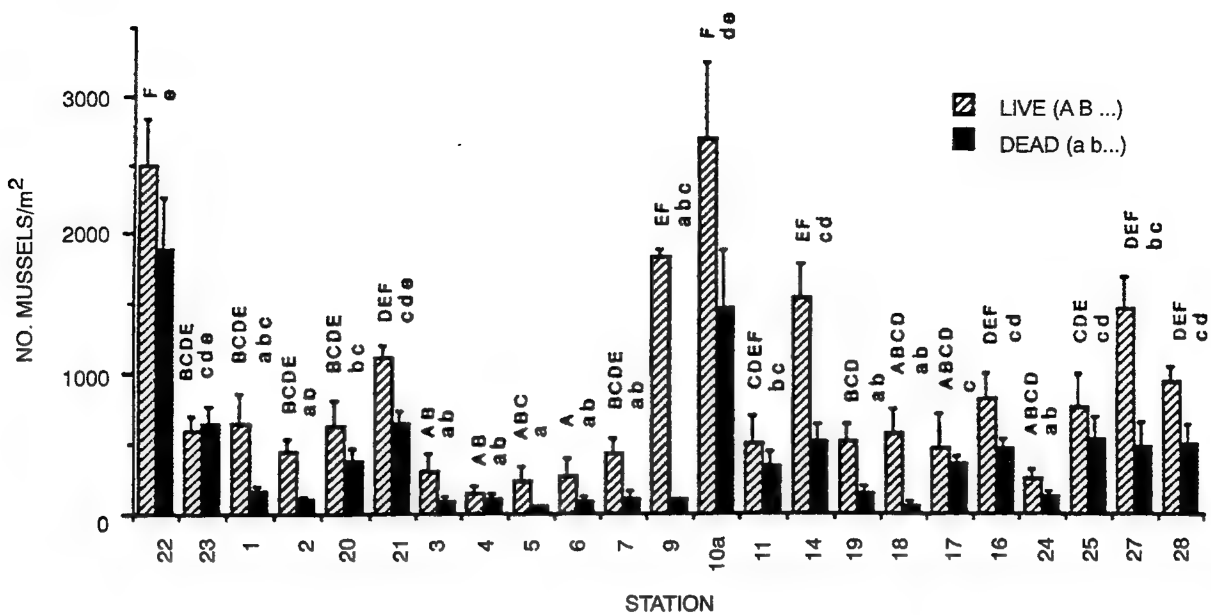


Figure 3-56. Live and dead mussels/m^2. Standard error used; means with differing letters are significantly different at the 0.01 level; n=10. (Stations are in the order of their distance from the ocean.)

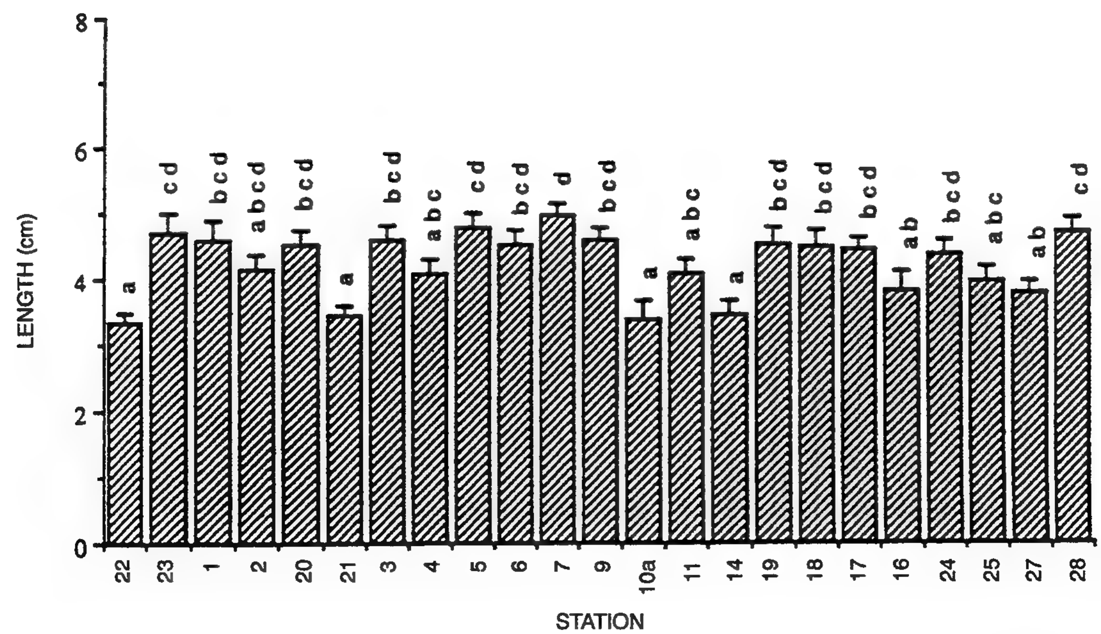
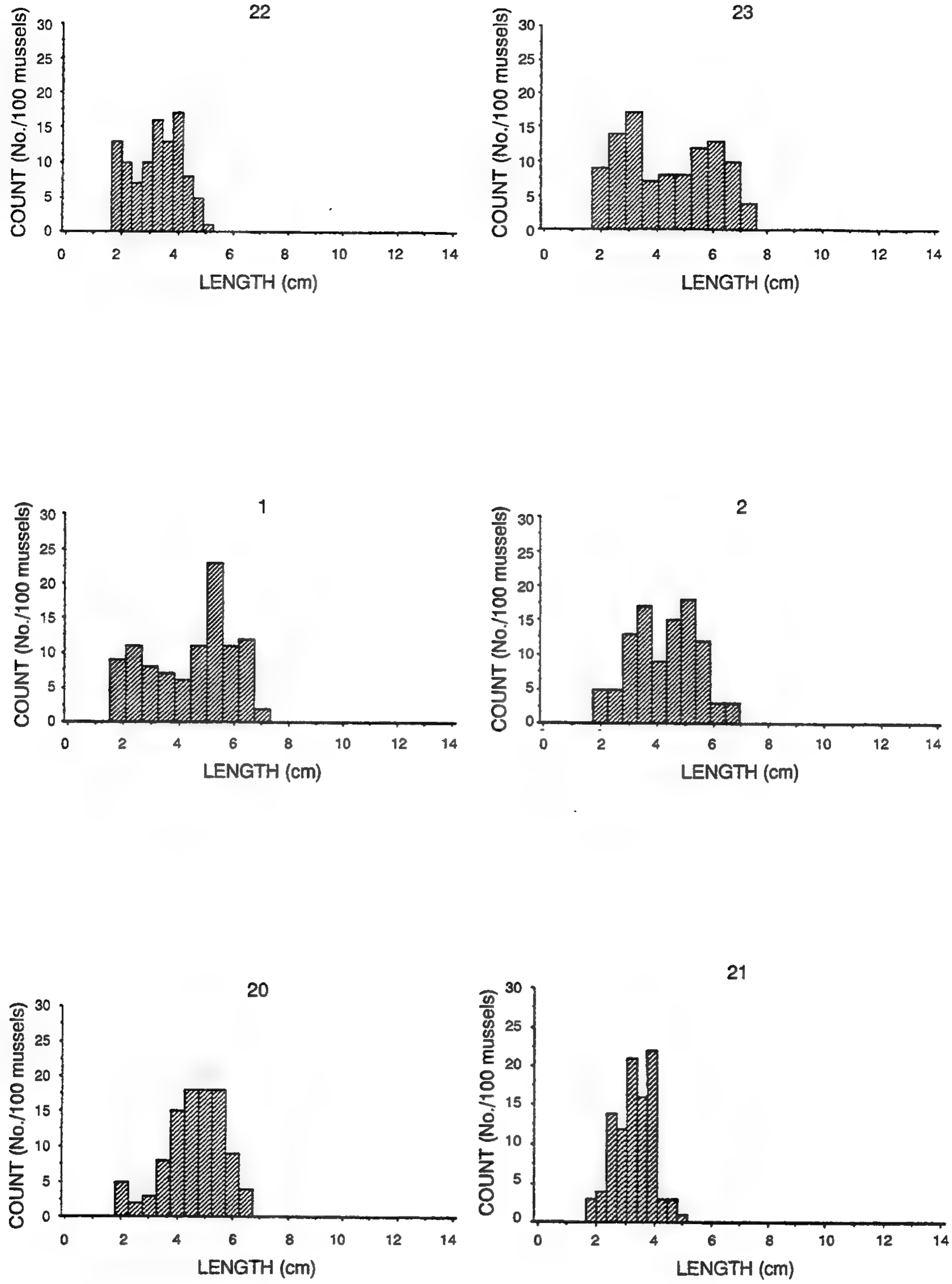


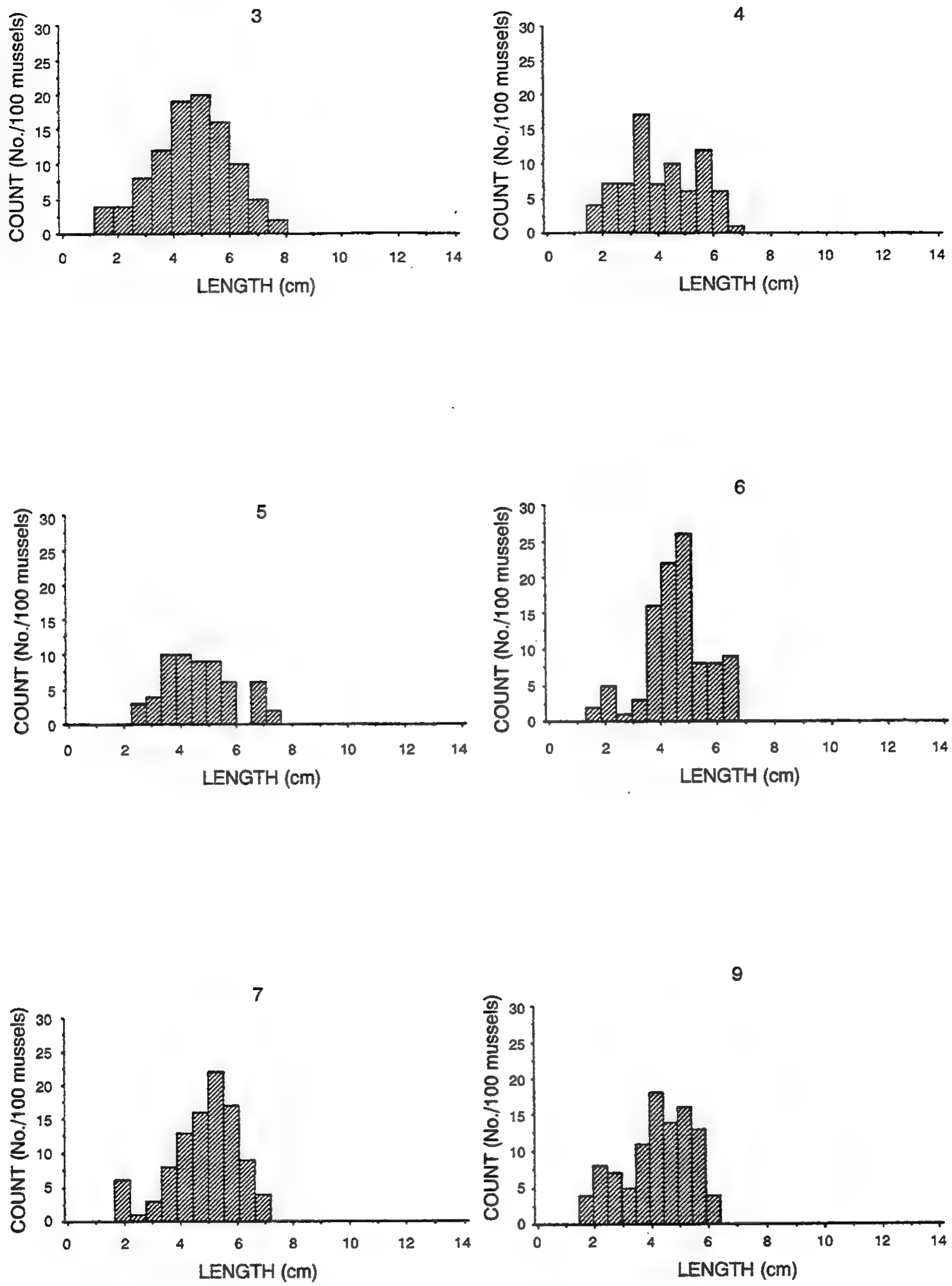
Figure 3-57. Mean mussel length per station. Standard error used; means with differing letters are significantly different at the 0.01 level; n=30. (Stations are in the order of their distance from the ocean.)



(a) Mouth of Portsmouth Harbor and York River stations

(Contd)

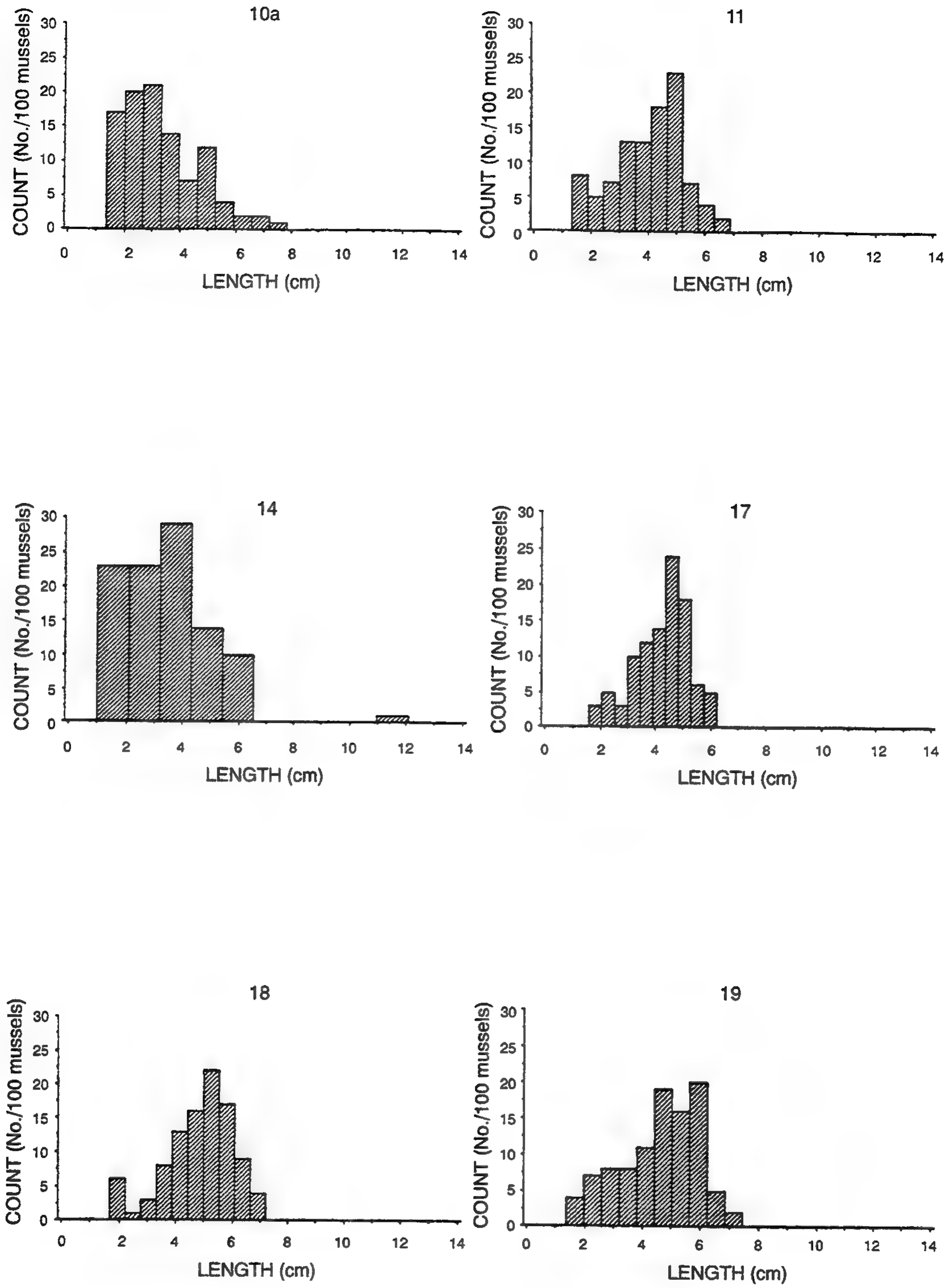
Figure 3-58. Size frequency distributions of mussels greater than 1.0 cm during the fall of 1991.



(b) Clark Island Embayment

(Contd)

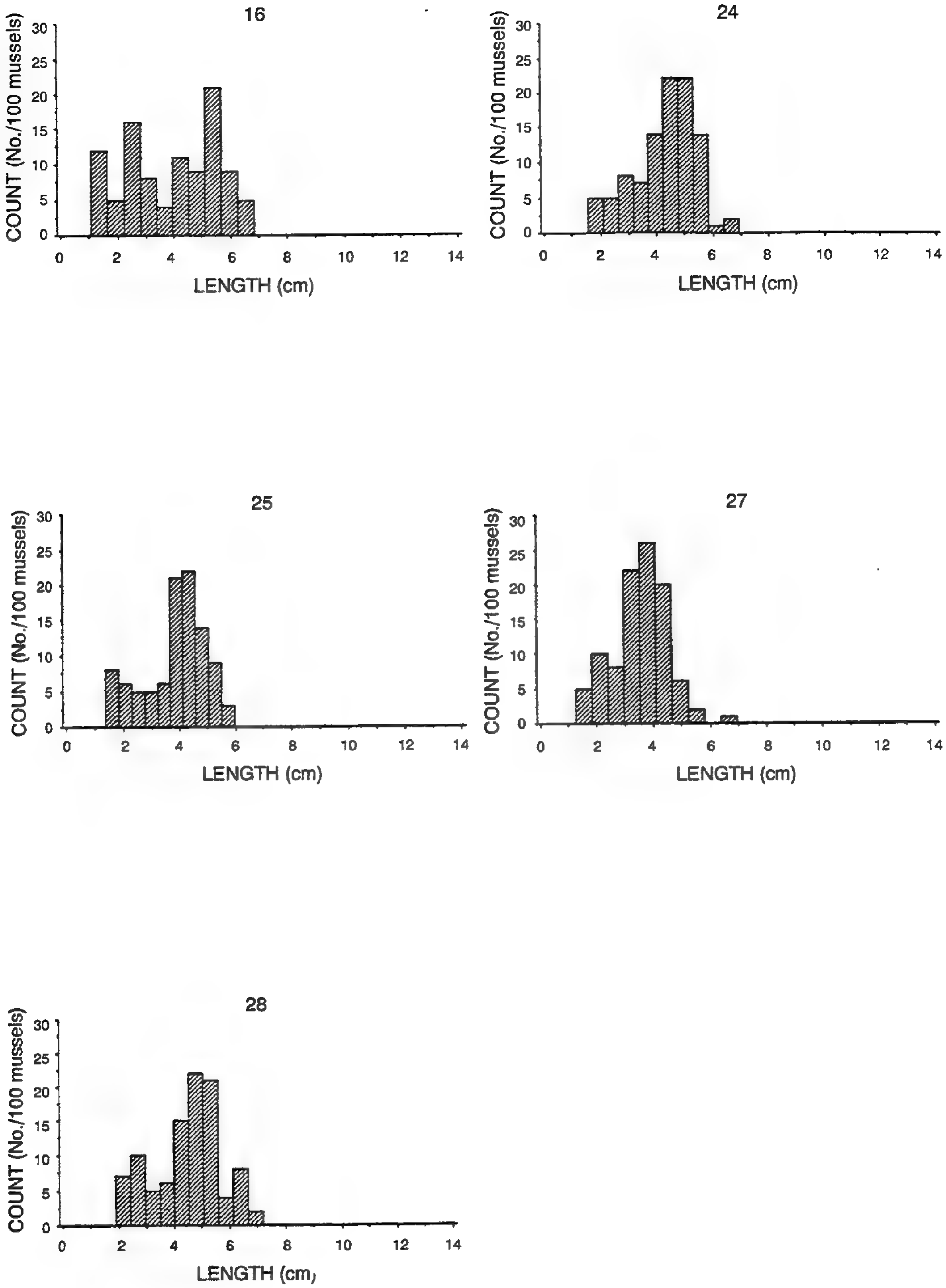
Figure 3-58. Continued.



(c) Main and back channels of Seavey Island

(Contd)

Figure 3-58. Continued.



(d) Upriver of Seavey Island

Figure 3-58. Continued.

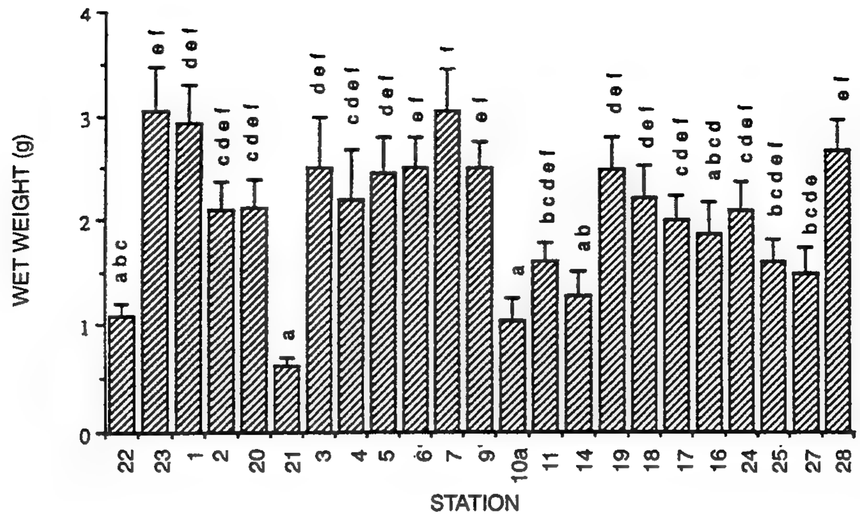


Figure 3-59. Mean wet weight of mussels per station. Standard error used; means with differing letters are significantly at the 0.01 level; n=30.

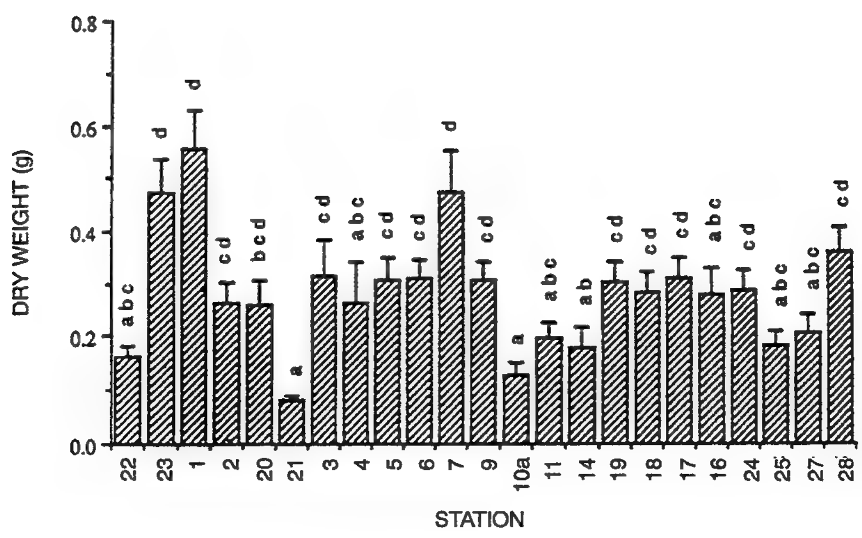


Figure 3-60. Mean dry weight of mussels per station. Standard error used; means with differing letters are significantly at the 0.01 level; n=30.

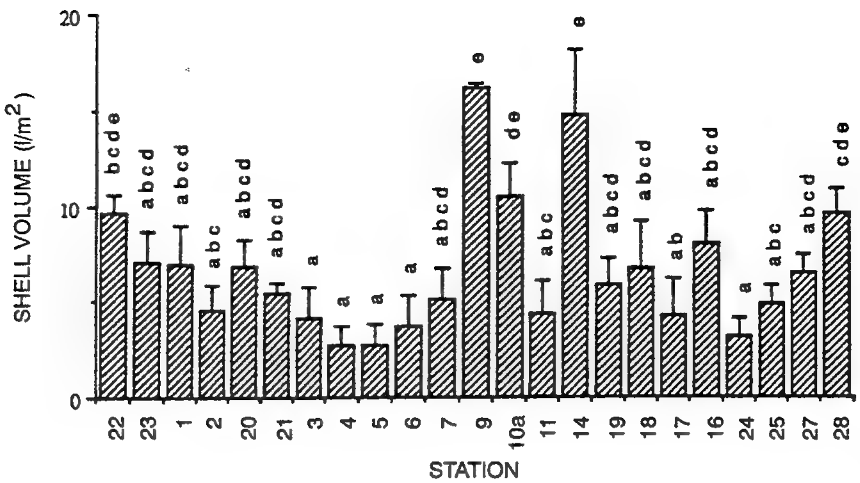


Figure 3-61. Mean shell volume. Standard error used; means with differing letters are significantly at the 0.01 level; n=30.

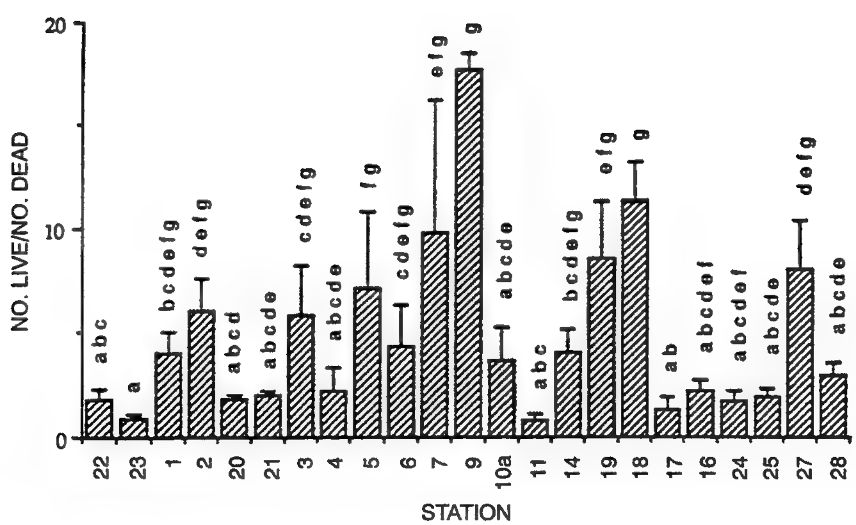


Figure 3-62. Number of live: number of dead mussels per station. Standard error used; means with differing letters are significantly at the 0.01 level; n=30.

Table 3-6. Summary of analysis of variance models.

Dependent Variable	F-Ratio	P-Value (0.05)
No. Live †	10.386	0.0001
No. Dead †	7.663	0.0001
Shell Volume	3.645	0.0001
Length	4.695	0.0001
Wet Weight †	5.38	0.0001
Dry Weight †	4.982	0.0001
No. Live: No. Dead †	4.093	0.0001
No. Live: Shell Volume	8.296	0.0001
Length: Wet Weight	2.985	0.0001
Length: Dry Weight	1.19	0.2488
Wet Weight: Dry Weight	1.718	0.0219

Note: Stations were the independent variables; † indicates log transformation of data where heterogeneous distributions were found.

DISCUSSION

At three of the sites with high mussel abundance (Stations 22, 21, and 10a), mean length was small at <4.0 cm (figures 3-56 and 3-57), and wet and dry weights were low (figures 3-59 and 3-60). With modal size frequencies being small at these three sites, it is evident that successful recruitment occurred. When size frequencies of all 23 sites were compared, a pronounced pattern was apparent. On average, larger size frequencies were found at the mouth of the Portsmouth Harbor and York River sites than at the remaining sites (figures 3-58a through 3-58d). Intermediate sizes, on average, were found at sites on either side of Seavey Island in the main and back channel. Mussel lengths decreased at the upriver sites. This pattern is as expected, with a greater distribution of all size classes near the open ocean where ice scouring would be less severe than in upriver locations. The smallest mussels were found in Clark Cove, because these mussels were all collected intertidally. At the lower, middle, and upper Piscataqua River sampling areas, both intertidal and subtidal collections were made. Because mussels from the Clark Cove were all collected intertidally, subtidal mussels were excluded. Although shell length does not always correlate with meat weight (Bayne, 1964; Widdows, 1991), mussels decrease in meat weight from subtidal to intertidal locations (Aldrich and Crowley, 1986). Thus mussels collected from intertidal locations (Stations 2–10 and 12–23) may not compare with samples that include both intertidal and subtidal mussels (Stations 1 and 11).

Stations 9 and 14 had mussels with the greatest shell volume of all the sites (figures 3-61). Although the mean shell volume of four of the six Clark Cove sites had the smallest shell volumes of the 23 sites, they did not have the lowest mean dry weights, indicating shell volume may not reflect overall mussel condition.

Because of the significant variability in nearly all comparisons between sites, perhaps future work should carry out comparisons within mussel populations from the same location. However, some general patterns were evident at several sites. Low mortality of mussels was apparent at Stations 9 and 18 (figure 3-62). High length : weight ratios occurred at Stations 21, 10a, and 14 (figure 3-63) and high density:shell volume occurred at Stations 22, 21, and 10a (figure 3-64). Mussels had a low dry weight:shell volume at Stations 22, 21, 9, 10a, and 14 (figure 3-65). From

the data, the mussel populations from Stations 21 and 10a appear more similar in population characteristics than those at the other sites.

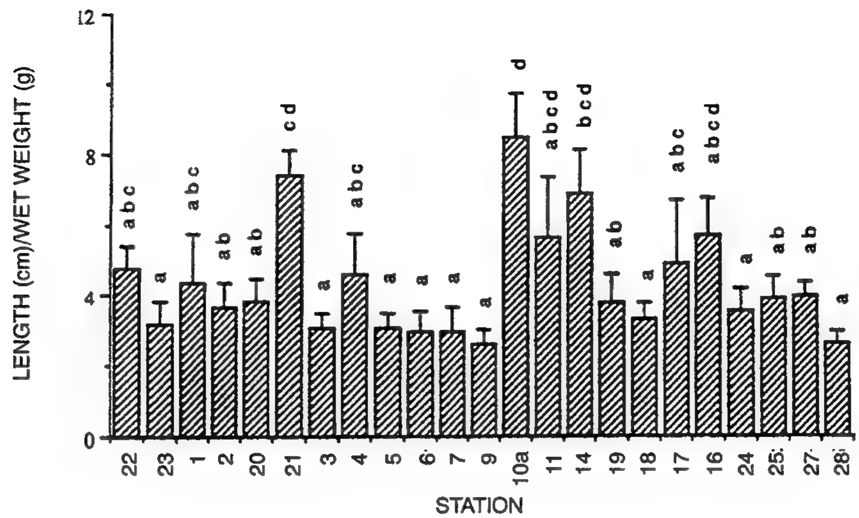


Figure 3-63. Mussel length: wet weight per station. Standard error used; means with differing letters are significantly at the 0.01 level; n=30.

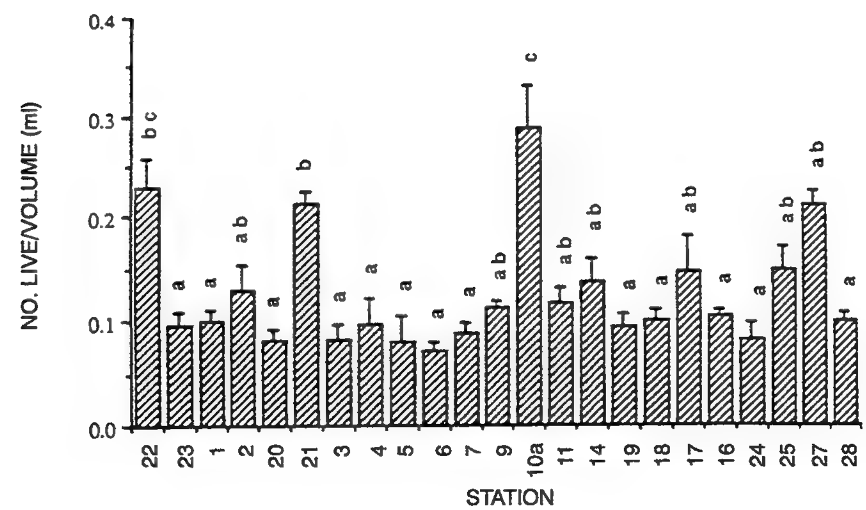


Figure 3-64. Number of live: shell volume per station. Standard error used; means with differing letters are significantly at the 0.01 level; n=10.

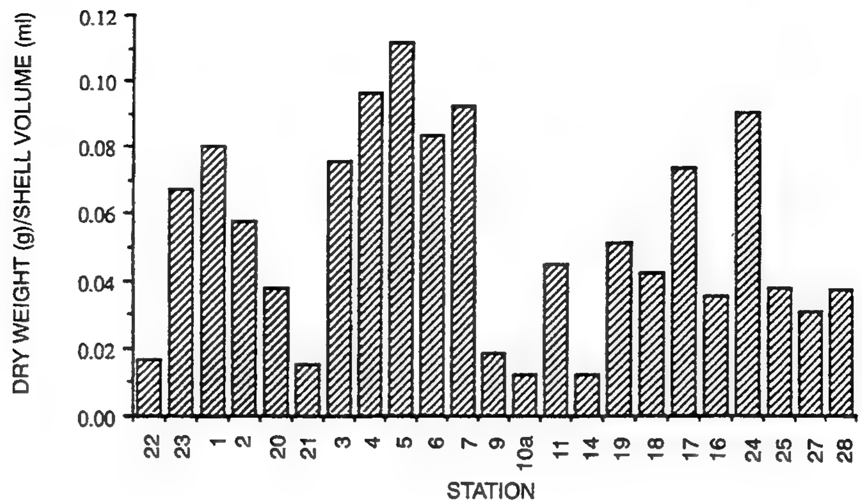


Figure 3-65. Dry weight: shell volume per station; n=10.

3.11 MUSSEL DEPLOYMENTS

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ABSTRACT

The blue mussel, *Mytilus edulis*, was deployed at six sites (Stations 2, 8, 10, 15, 19, and 22) to supplement water-column-exposure measurements and toxicity data, and to support the assessment of living natural resources. The scope for growth (SFG) index, a measurement of physiological condition, was calculated to determine chronic water-column contaminant effects. The SFG index at Station 15 was significantly higher than the index at Stations 2, 8, 19, and 22. No correlation was observed between the reduced physiological index in animals from Stations 2, 8, 19, and 22 and the reduction in successful fertilizations in the Sea Urchin Fertilization Assay at Stations 3, 4, and 7 discussed in Section 3.4 of this document.

INTRODUCTION

The blue mussel, *Mytilus edulis,* has been used both in NOAA's Status and Trends Program and in EPA's Mussel Watch Program as well as in in-situ deployments conducted to determine biological effects of pollutants (Nelson et al., 1987; Widdows et al., 1981; Widdows et al., 1982; Stickle et al., 1983). Research has demonstrated that the SFG index, a measure of physiological condition in the blue mussel, is a sensitive indicator of chronic contaminant-induced effects and that a sustained reduced SFG index results in decreased growth, diminished organism health, and reproductive impairment (Nelson, 1990; Bayne et al., 1981).

When SFG index is quantified, whole animal responses are integrated to determine the energy available for growth and reproduction. Three parameters are measured: clearance rate, respiration rate, and food assimilation efficiency. Clearance rate is determined by an electronic particle counter which detects incoming and outgoing algal particle concentrations. Respiration rate is determined by measuring the decline in O_2 with an oxygen meter, and assimilation efficiency is determined by collecting, drying, and weighing the fecal material.

In addition to their usefulness in assessing the biological impact of pollutants in the marine environment, mussels have also been shown to be excellent integrators of water-column contamination (e.g., Nelson et al., 1987). While grab sampling provides a "snap-shot" of current water column conditions, the dynamic nature of tidally driven systems results in temporal variation in measured parameters. Deployed in situ over reasonably long periods of time ($\geq$28 days), tissue residues reflect temporally averaged water-column contaminant levels. This method is more effective for measuring trace levels of waterborne organic contaminants than is an analysis of the extremely large volumes of water which must be sampled to obtain a representative measure of these compounds. In this study, information obtained through the trace metal analysis of water samples was supplemented with the analysis of tissue residues of mussels deployed in cages at stations in the estuary.

METHODS

Mussels were collected by clam rake near Sandwich, MA, and prepared following ERLN SOPs 1.02.001 and 1.02.002 (Mueller et al., 1992). They were sized before deployment.

Subsamples (predeployment mussel samples) were frozen for subsequent chemical analysis. Mussels were transported in insulated coolers to UNH-JEL. The mussels were then deployed at six stations around Seavey Island, at upriver and downriver sites, and in the York River (Stations 2, 8, 10, 15, 19, and 22) for a subsequent evaluation of tissue chemistry and physiological impact. They were deployed for 28 days 1 meter above the bottom, as described in ERLN SOP 1.02.002 (Mueller et al., 1992). Deployed arrays were retrieved, and transported to ERLN for physiological assessment as described in ERLN SOP 1.03.013 (Mueller et al., 1992). The scope for growth (SFG) index in joules per hour (J/h), is an index for physiological well being that takes in account feeding rates and assimilation efficiency. The SFG is determined by:

$$SFG = (CA) - R$$

where

C = energy assimilated (J/h)

A = assimilated efficiency (%)

R = energy lost through respiration (J/h)

Statistical analyses were conducted using a one-way ANOVA to test for differences between stations. Tukey's Studenized Range Test was applied if the ANOVA test was significant ($p = 0.05$).

RESULTS AND DISCUSSION

Deployed *Mytilus* were retrieved from all stations but Station 10, where cages were lost, presumably due to their interference with activities at that site. When adjusted for tissue biomass, mussels at Station 15 displayed a statistically higher SFG index than mussels at Stations 2, 8, 19, and 22 (figure 3-66; see Appendix J for raw data). No correlations were observed between reduced SFG at Stations 2, 8, 19, and 22 and reduced fertilization observed at Stations 3, 4, and 7 in the Sea Urchin Test conducted at all 23 stations and described in Section 3.4 of this document. The levels of chemical contamination detected in deployed mussels are presented in Section 3.13.

The SFG is a relative measure between "reference" and "treatment" stations. Differences in SFG measurements between "reference" and "treatment" stations have been correlated to chemical exposure. In this study, Station 22 in York Harbor was used as the reference station. The interpretation of the results obtained is that there were no differences in SFG between Stations 2, 8, 19, and the "reference," but there was a statistically significant difference detected for Station 15, indicating there was some stress that affected the mussels deployed at Station 15. It is unknown what the source of stress was, but it is consistent with the fact that indigenous mussels were not observed at Station 15.

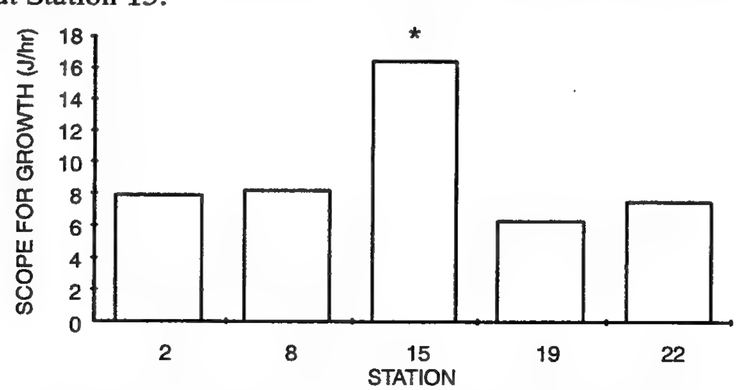

Figure 3-66. SFG index of deployed *Mytilus edulis*.
(* = statistically significant difference.)

3.12 INFAUNAL INVERTEBRATE ASSESSMENT

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INTRODUCTION

As sessile organisms, benthic infauna are good indicators of change around a particular point of environmental stress. Populations must adjust to conditions at a particular site, depending on chemical and physical conditions within the sediment and at its surface. Assuming that the physical characteristics of the habitat (grain size, depth, current, etc.) remain reasonably constant, then changes in population parameters can often be associated with changes in chemical characteristics (nutrients, toxics, etc.). The ecological risk to benthic populations can be measured by the level of potentially toxic chemicals within the organisms (bioaccumulation) as well as how population changes may or may not have occurred in response to the effects of certain chemicals.

The types and quantities of benthic infauna populations in the Piscataqua River–Great Bay system have been fairly well characterized because of environmental studies related to industrial development within the Piscataqua River and because of the studies conducted by UNH JEL. The NPDES requirements placed on power plants in the Piscataqua River (Schiller and Newington Stations) have been a source of substantial data from the 1970s to the mid-1980s. In the present study, infaunal invertebrates were assessed to characterize the benthic community from the same samples that were collected for chemical contaminant analysis and sediment grain size analysis. Benthic organisms are typically good indicators of environmental stress and, in conjunction with other environmental assessments done at each station, may reflect environmental stress associated with chemical contamination.

METHODS

In September 1991, four surficial Shipex samples were collected from each of the 23 original stations (excluding Stations 10A and 12A) in the lower Piscataqua River and the nearby York River from the R/V MARITIME, a 27-foot research vessel owned and operated by Normandeau Associates, Inc. (NAI) (see figure 2-7). Station locations were determined from detailed station descriptions provided by UNH. Each grab sample was divided into quarters. The surficial sediment from one quarter of each of the four Shipex samples was combined to form a composite for subsequent chemical analysis. The remaining three quarters were handled in like fashion to produce samples for geophysical and microbial determinations, for toxicity evaluation, and for archiving. The grab sampler was decontaminated between replicates using ERLN SOP 2.02.002 (Mueller et al., 1992). Samples were stored on ice following collection and initial handling. Chemistry samples were frozen immediately upon return to NAI and remained so until analyzed by Ceimic Corp. All other samples were stored under refrigeration before analysis.

To supplement sediment toxicity measurements, and to support the assessment of living natural resources, benthic community analyses were conducted at each of 23 sediment sampling stations (Stations 1–21 in Portsmouth Harbor and Stations 22 and 23 in York River). Samples

were obtained during sediment collection activities so that benthic community composition could be compared directly with grain size, organic content, and sediment contaminant concentrations, as well as with sediment toxicity. Material from four replicate 23 cm × 23 cm Shipex grab samples from each station were sieved onto 0.5-mm screens. Recovered organisms were relaxed using isotonic magnesium chloride and preserved with 6% buffered formalin; the subsequent sorting and enumeration of individuals was carried out to the lowest practicable taxonomic level. All data were coded, keyed into a database, and quality-verified with error-checking routines. Data were transferred to ERLN for inclusion into the project database.

RESULTS

Benthic infauna at the 23 stations were collected over seven dates between September 9 and 17. All taxa enumerated in the samples are listed by station and replicate in Appendix K. For each taxon encountered, the National Ocean Data Center (NODC) taxonomic code, the raw count, and the density (number per square meter) are listed.

In order to gain a quick overview of these data and identify trends, the mean abundance and the total number of taxa for four replicates per station were calculated (table 3-7). The median number of total taxa recorded per station was 55, with a range from 24 to 102. The number of taxa at the majority (70%) of stations was in the 40 to 80 range, with four stations (Stations 1, 5, 6, and 7) having less than 35 taxa and three stations (Stations 12, 16, and 18) having more than 89 taxa.

Table 3-7. Mean density and number of species of macroinvertebrates at stations sampled in September 1991.

Station		No. Taxa	Mean Density (No./m^2)	No. of Replicates
Cove (Jamaica Island)	3	58	17,437.50	4
	4	42	92,256.25	4
	5	24	15,518.75	4
	6	31	36,325.00	4
	7	25	10,531.25	4
	8	47	107,231.25	4
	9	73	15,075.00	4
Back Channel	18	102	31,537.50	4
Shipyard	19	62	67,181.25	4
Main Channel	10	67	23,425.00	4
Shipyard	12	89	73,581.25	4
	13	46	4,962.50	4
	17	69	71,181.25	4
Downriver	1	34	17,662.50	4
	2	53	113,956.25	4
Upriver	15	64	71,206.25	4
	16	102	54,587.50	4
11, 14 (NH)	11	55	10,650.00	4
21, 20 (ME)	14	61	13,812.50	4
	20	50	16,268.75	4
	21	41	14,312.50	4
York Harbor	22	77	10,968.75	4
	23	80	33,956.25	4

Stations sampled were loosely grouped into geographic areas to examine density differences in both the near field and far field, as they relate to Seavey Island. Results indicated that in some instances there was a high degree of variability within a group of associated stations as well as among replicates within a station, as indicated by the range of standard deviation (figure 3-67). Of the 23 stations, mean infaunal densities at 15 stations were generally between 10,000 and 40,000 organisms/m^2. Within this group, three pairs of associated stations at Spruce Creek (Stations 20 and 21), the New Hampshire side across from Seavey Island (Stations 11 and 14), and the reference stations in York Harbor (Stations 22 and 23) had fairly similar densities, while other groups had more disparate densities. A second group of five stations (Stations 12, 15, 16, 17, and 19) had mean densities ranging from 55,000 to 75,000 organisms/m^2 while three stations (Stations 2, 4, and 8) had mean densities ranging from over 90,000 to just under 115,000/m^2. A few of these higher density stations (Stations 2, 4, and 19) also had higher within-station variability as measured by standard deviation.

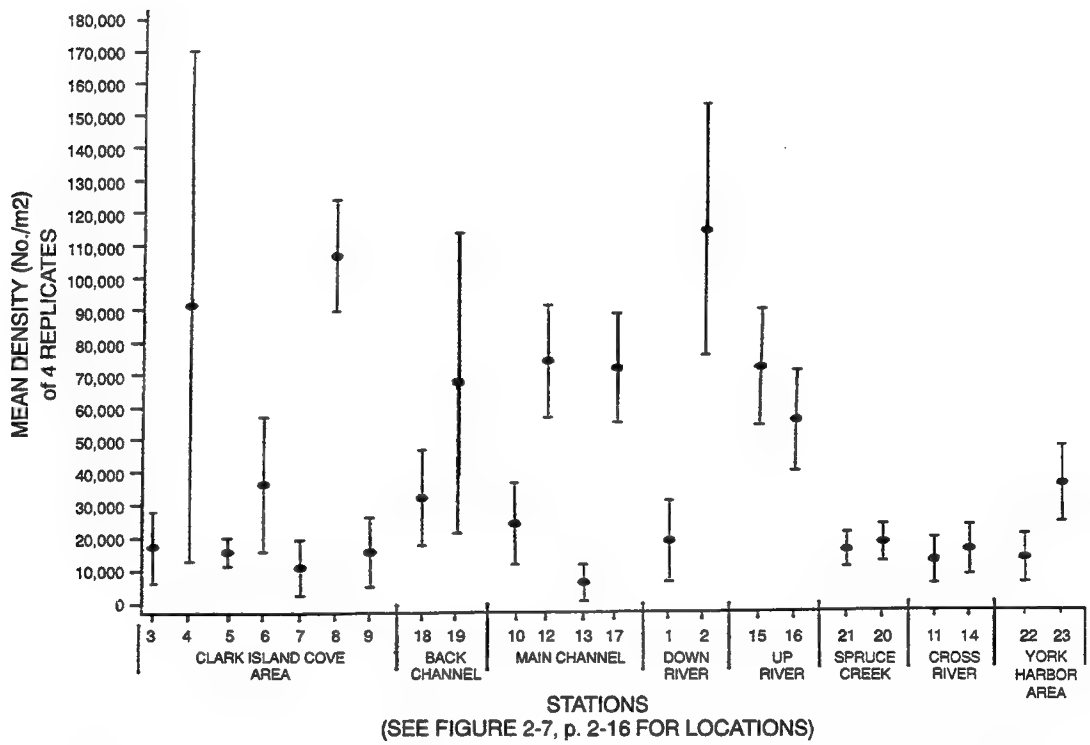

Figure 3-67. Mean density and ± 1 standard deviation of benthic infauna at each station, September 1991.

Examining the ten most abundant taxa within each station demonstrates what types of organisms contributed to the above densities (table 3-8). Ten taxa made up from 70% (Station 22) to 98% (Station 4) of the total abundance at each station. Not surprisingly for a temperate estuary, oligochaetes, polychaetes, cirratulids and tube-forming amphipods (i.e., *Ampelisca* sp.) dominated the populations. The stations with the greatest abundances (Stations 2, 4, and 8) were dominated by very few taxa (table 3-9). Two of the three most abundant taxa at these stations comprised over 90% of the total density; the polychaete *Streblospio benedicti* was clearly the single dominant species at these more abundant stations. In the next lower (but still high density) group of stations (Stations 12, 15, 16, 17, and 19) several more taxa contributed to the greatest

Table 3-8. Percent composition of the ten most abundant benthic infauna at each station sampled in September 1991.

Taxon	Station (% Composition)																						
	Cove (Jamaica Is.)							Back Channel Shipyard		Main Channel Shipyard				Downriver		Upriver		11,14(NH); 21,20(ME)				York Harbor	
	3	4	5	6	7	8	9	18	19	10	12	13	17	1	2	15	16	11	14	20	21	22	23
Aglaophanus neotenus																							
Ampelisca abdita		0.91	1.61	1.33	3.98	0.52				11.48	8.99							2.73			1.01		
Ampelisca sp.	6.14	1.61			2.75	0.29			1.07	17.16	4.13		1.82			0.61				2.68	0.92		
Amphipholis squamata								1.21													2.98		
Anonia sp.							3.26	6.37				2.48		0.27								7.17	
Aricidea (Achira) catherinae				0.32			1.57	2.26		16.95	35.22	10.74	0.50			1.08	10.54			1.25	0.90		16.02
Aricidea (Achira) sp.											3.10		0.37		0.13	0.30							2.51
Capitella capitata			0.55				1.33	16.91	1.29			41.87		6.64		8.04		1.36					
Cirratulidae	3.29	20.56	6.12	8.15	8.18	2.16	3.56	4.24	1.03	14.65	14.86	3.06	2.25	9.86		2.38	7.07	2.94	4.75	2.72	2.06		
Cirratulus grandis							5.98	1.74															
Clymenella torquata											1.63						8.99		13.24			6.33	4.22
Corophium insidiosum																		2.73					2.76
Exogone nebes																	1.36			0.95	0.76	2.39	1.78
Gammarus oceanicus																			5.56				
Gastropoda																		1.05	2.34				6.92
Leitoscoloplos sp.																					2.18		
Lepidonotus squamatus								0.99															
Littorina littorea														1.57									
Macoma sp.																0.31							
Maldanidae																	1.82		4.49			2.44	
Mediomastus sp.		0.33		0.34			1.38			1.38										1.36			
Microdeutopus sp.														0.27									

(Contd)

Table 3-8. Continued.

Taxon	Station (% Composition)																						
	Cove (Jamaica Is.)							Back Channel Shipyard		Main Channel Shipyard				Downriver		Upriver		11,14(NH); 21,20(ME)				York Harbor	
Microphthalmus aberrans		0.91	1.33		3.36																		
Mytilidae	9.84		0.79		1.27	0.28	18.62	11.95	0.81	2.74		9.59	1.30		1.51	4.46	20.62	9.75	11.08			14.39	21.94
Nassarius trivittatus																						4.12	
Neanthes virens														0.41									
Nephtyidae	1.60	1.22	63.33	1.48	15.13	0.74																	
Nereidae														0.34									
Ninoe nigripes	1.23									2.33													
Oligochaeta	42.80	12.79	20.65	25.81	45.90	12.33	38.00	36.58	27.40	15.14	11.50	4.79	48.03	55.00	13.71	60.55	29.72	60.80	15.76	51.44	64.23	2.58	17.35
Pholoe nimuta								1.05				1.98											
Photis macrocoxa															0.16								
Phoxocephalus holbolli									3.83						1.17								3.93
Polydora cornuta														3.11				1.36			3.91		
Prionospio sp.			0.86	0.56	1.40	0.28																	
Prionospio steenstrupi		0.38	0.86	0.59	2.69	0.15																	
Pygospio elegans	3.25	1.01		0.82		0.75			1.84				1.18		0.30		3.05		13.27	1.80		6.61	6.01
Rhynchocoela										1.43													
Scoletoma hebes							2.95		2.20		5.84	1.49	1.60		2.40					6.50			
Scoletoma sp.	2.45						1.99		3.04		1.24		1.14		2.84		1.15			10.94			
Spio setosa																			3.66				
Spiophanes bombyx																						15.98	
Streblospio benedicti	14.01	58.33	0.71	57.92	10.42	80.55			52.86	1.96		5.21	36.47	19.51	75.89	17.19		2.78	1.68	10.79	12.86		
Tellina agilis	1.35										1.36	3.64			0.21	0.40	1.78	0.7[illegible]				8.06	
All Above Species	85.96	98.04	98.62	97.32	95.09	98.04	78.64	83.30	95.36	85.20	87.87	84.85	94.65	96.99	98.32	95.31	86.11	[illegible]	[illegible]	[illegible]	91.81	70.06	83.44

Table 3-9. Percent composition of dominant infauna taxa at stations with highest abundances.

Very High Density Stations (x>90,000/m^2)			
Taxon	Station (% Composition)		
	4	8	2
Streblospio benedicti	58	81	76
Cirratulidae	21	2	
Oligochaeta	13	12	14
Total	92	95	90

High Density Stations (x>50,000/m^2)					
Taxon	Station (% Composition)				
	19	12	17	15	16
Steblospio benedicti	53		36	17	
Oligochaeta	27	12	43	61	30
Scoletoma sp.	3				1
Phoxocephalis holbolli	4				
Scoletoma hebes	2	6	2		
Capitella capitata				8	
Aricidea catherinae		35			11
Aricidea sp.		3			
Cirratulidae		15	2		7
Ampelisca abdita		9			
Ampelisca sp.		4	2		
Mytilidae				4	21
Clymenella torquata					9
Pygospio elegans					3
Total	89	84	85	90	82

proportion (80% to 90%) of the total abundance. Oligochaetes played a larger role at these stations, but *S. benedicti* and other polychaetes were also still quite abundant. Within this group of stations, populations at Stations 15, 17, and 19 were more similar than populations at Stations 12 and 16, which were more unique, even compared with each other. At the lower density stations (although 10,000 to 40,000 organisms/m^2 is not viewed as low), there were still several stations (Stations 1, 3, 6, 7, 11, 20, and 21) where the oligochaetes and *S. benedicti* dominated the population, comprising 55% to 90% combined. The other seven lower density stations had other species combinations contributing greater proportions to the total population at each station.

DISCUSSION

As discussed above, the invertebrate infauna are influenced by the physical and chemical characteristics of the sediment and habitat in which they live. Several of these parameters were measured in this study, including sediment grain size, depth, current, eelgrass density, nutrients, and concentrations of potentially toxic chemicals. A full synthesis of this information as it relates to the benthic infauna and the potential ecological risk is beyond the scope of this report. However, some discussion of spatial (station) differences is warranted at this point.

Clark Island Cove Area (Stations 3–9). The two peripheral stations in this area (Stations 3 and 9) were eelgrass stations with relatively low densities but relatively high numbers of taxa compared with other stations in the project area, indicating greater diversity. The remaining stations in this area had mud substrate, with two stations (Stations 5 and 7) having the lowest number of taxa and among the lowest densities in the study. Two other stations (Stations 4 and 8) had very high densities but relatively fewer taxa (42 to 47); as discussed above, these stations were dominated by only two or three taxa. The five stations with mud substrate (Stations 4, 5, 6, 7, and 8) need further examination to determine why there was such a disparity in infaunal populations when substrate and general location were quite similar.

Back Channel (Stations 18 and 19). Both of these stations had eelgrass, but had different substrates. Samples from Station 18 had a gravel content, which probably contributed to the high numbers of taxa (102) at that station, even though the densities were only half of those at Station 19. Populations at Station 19 were similar to those at the upriver end of Seavey Island at Station 17.

Main Channel (Stations 10, 12, 13, and 17). Each of these stations was unique in its own right. Station 13 was unique in having the lowest mean density of organisms in the study, 50% lower than any other station. *Capitella capitata*, a pollution-tolerant species, dominated that station and no other; numbers of taxa there were also in the lower third of all stations. While this area may call for closer examination, it is interesting to note that Station 17, which is nearby, exhibited much higher densities and numbers of taxa. Populations at Station 17 were like those at Station 19.

Downriver (Stations 1 and 2). Station 2 had the highest mean abundance of any station ($114{,}000/m^2$) and was similar in most characteristics to Station 8 within Clark Island Cove. In that sense, it would appear to make a good near-field "reference station" to Station 8, assuming that any problems at Station 8 do not extend to Station 2 on Newcastle. Station 1, an eelgrass station, had lower abundance and low numbers of taxa, even though close to the open ocean, which seems a little unusual.

Upriver (Stations 15 and 16). These stations, although both having eelgrass, are in a lower energy sandy mud area (Station 15) and a high energy area (Station 16). Station 16 had a very high number of taxa (102) and a high mean density. To some degree, this station could act as a near-field reference station for Station 12 at Seavey Island.

Cross-River Stations (11 and 14) and Spruce Creek Stations (20 and 21). These stations were reasonably similar to each other in most faunal characteristics, even though only two had eelgrass (Stations 11 and 14) and one was sandy (Station 14). They appeared to demonstrate among the lowest variability. The relative abundance of bamboo worm, *Clymenella torquata*, at Station 14 was the only unusual characteristic apparent in the infauna of this station grouping. In that sense, it may be useful to compare the sediment chemistry at these stations with those just adjacent to Seavey Island to make comparisons related to ecological risk.

York Harbor (Stations 22 and 23). These far-field reference stations were quite sandy, indicating higher energy areas. Numbers of infauna taxa at these stations were high, but densities were in the low to moderate end, indicating high diversity. Some taxa (*S. benedicti*, cirratulidae, and *Ampelisca* spp.) that were abundant in many Piscataqua samples were not among the 10 most abundant in York Harbor. Species generally associated with higher energy estuarine environments (mytilidae, *Clymenella torquata*, etc.) were more abundant.

3.13 CHEMICAL CONTAMINATION IN MARINE SEDIMENTS, TISSUES, AND WATER SAMPLES FROM THE PISCATAQUA RIVER AND GREAT BAY ESTUARY

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INTRODUCTION

OBJECTIVE

Chemical contamination levels in marine water, sediment, and tissue samples, collected from the Piscataqua River and Great Bay Estuary (figure 2-1), were measured to evaluate the magnitude and distribution of chemical pollution in the estuary. Within the context of the Estuarine Ecological Risk Assessment (estuarine study) for the Portsmouth Naval Shipyard, chemical contamination levels provide a measure of exposure to hazardous waste releases that can be evaluated to determine the potential risk to the ecology of the estuary. Chemical contamination levels measured in water samples give an indication of what is currently being released (or remobilized), levels measured in sediments reveal information on past releases, and contamination levels measured in the biota provide information on the biological uptake (bioaccumulation) and food chain accumulation (trophic transfer or biomagnification) of the chemical pollutants. The exposure information can be combined with measurements of toxicity, ecological stress, and biological effects thresholds to evaluate the availability and mobility of the contamination. In addition, the distribution of chemical compounds can provide information on gradients and potential sources of contamination in the estuary.

QUALITY CONTROL REQUIREMENTS FOR ECOLOGICAL ASSESSMENTS

The data quality objectives for conducting the estuarine study required the use of field and laboratory methods that were capable of measuring parts-per-billion levels of organic and inorganic contaminants in marine and estuarine sediments and tissue (fish, invertebrates, and plants). No procedures capable of making interference-free or trace-level measurements of environmental contaminants in marine matrices have been officially approved by regulatory authorities. Therefore, quality control procedures were implemented to assure that high-quality data were obtained at levels low enough to accurately assess the ecological effects of contamination.

[1]Current Address: NCCOSC RDT&E Division, Marine Environmental Support Office, East Detachment, Code 5221, 27 Tarzwell Drive, Narragansett, RI 02882.

The quality assurance/quality control (QA/QC) plan consisted of a performance-based program, with protocols, criteria, and procedures for corrective action, that was enforced for all field collection and laboratory chemical analysis activities performed for the offshore study (MESO and ERLN, 1992; see Appendix C of Mueller et al., 1992). The ecological risk QA/QC plan expands on areas not addressed by the USEPA Contract Laboratory Program (CLP). Accordingly, the procedures outlined in the ecological risk QA/QC plan should be viewed as guidance protocols for those areas which are not addressed by CLP methods. It is the philosophy of the ecological risk QA/QC plan that as long as proper QA/QC requirements are enforced, and an acceptable analytical performance on standard reference material is continuously demonstrated, the resulting data can be factually validated and deemed acceptable for regulatory or management purposes. In addition, multiple methods and procedures used by different laboratories for the analysis of similar compound classes should yield comparable results.

The analytical methods and QA/QC procedures used for this project are documented in "Standard Operating Procedure for the Estuarine Ecological Risk Assessment at Naval Shipyard Portsmouth" (Ceimic Corp., 1992), MESO and ERLN (1992), and Mueller et al. (1992). Similar procedures have been used to meet the data quality objectives for a variety of federal programs, including NOAA's National Status and Trends Program (MacLeod et al., 1985; Krahn et al., 1988; NOAA, 1991a; NOAA, 1991b); the EPA's Environmental Monitoring and Assessment Program (EMAP) (Valente and Strobel, 1991; Graves et al., in preparation; Strobel et al., 1991); the Puget Sound Estuary Program (Tetra Tech Inc., 1986a, 1986b); and the US Navy Risk Assessment Pilot Study at NCBC Davisville, RI (Gleason and Mueller, 1989; Munns et al., 1991; Mueller et al., 1992).

The ecological risk QA/QC plan did not require the use of particular analytical methods. Instead the chemical testing laboratory had to demonstrate proficiency through the routine analysis of standard or certified reference materials (SRMs or CRMs)[2] or similar types of accuracy-based standards. Through the application of this concept, the analytical laboratory (Ceimic Corp.) conducted ongoing performance evaluation exercises throughout the study, both to demonstrate initial capability (i.e., before the analysis of actual samples) and on a continuous basis throughout the project. The laboratory was required to initiate corrective actions if performance fell below certain predetermined minimal standards. In addition, the performing laboratory (1) participated in a performance evaluation exercise before analyzing samples for this project, (2) conducted an intensive analytical screen of analytes in matrices of interest before conducting routine analysis of the remaining samples, and (3) took part in an interlaboratory calibration, with the USEPA Environmental Research Laboratory Narragansett (Munns et al., 1991).

The QA/QC protocol required special emphasis on the performance-based program, which involved continuous laboratory evaluation through the use of accuracy-based materials. Each batch of samples contained a minimum number of quality control samples, including SRMs or CRMs or laboratory control materials, laboratory fortified sample matrices, laboratory reagent blanks, calibration standards, and laboratory and field replicates. The QA/QC plan also provided specific control limits or numerical data criteria that, when exceeded, required specific corrective action by the laboratory before the analyses could proceed. Warning and control limits were

[2]Certified reference materials are samples containing precise concentrations of chemicals, accurately determined by a variety of technically valid procedures and accompanied by a certificate or other documentation issued by a certifying body (e.g., National Research Council of Canada (NRC), USEPA, US Geological Survey). Standard reference materials are CRMs issued by the National Institute of Standards and Technology (NIST), formerly the National Bureau of Statistics.

specified, as was the recommended frequency of analysis for each QA/QC element or sample type. The conceptual basis for the use of these quality control samples is presented in detail in the document by MESO and ERLN (1992). In all other areas not explicitly addressed by the ecological risk QA/QC plan (instrument tuning, chain-of-custody, data validation, etc.), standard CLP protocols applied (McLaren/Hart Environmental Engineering Corp., 1991b).

The resulting data were validated according to specifications identified in the QA/QC plan. Furthermore, data-validation guidance promulgated by the USEPA Region I and USEPA CLP was used, to the extent practicable, to further evaluate the validity of the data presented in this report (McLaren/Hart Environmental Engineering Corp., 1992). The raw data package contained all the necessary information to conduct a complete data-validation exercise in accordance with the guidances cited above. The data validation consisted of examining the raw data package to determine if the results obtained for the analysis of the quality control samples and the instrument calibration procedures met the requirements specified in the QA/QC plan. Data flags were assigned, according to the predetermined usability and acceptability criteria. Holding time was only applicable to volatile organic analysis, since all sediments and tissues were held fresh-frozen until extraction or digestion and analysis (within 40 days; see description of methods).

The data-validation process consisted of inspecting the raw package to evaluate the acceptability and reliability of data based on results obtained for (1) instrument tuning and calibration, (2) method blanks and field and trip blanks, (3) matrix spikes and surrogate compounds, (4) internal standards and interference checks, (5) sample duplicate analyses, and (6) recoveries of standard reference materials. Other ancillary information, noted in the case narrative, was also evaluated to determine the presence of any sample bias and gauge the overall acceptability of the data. Results of the validation were provided on hardcopy, with highlighted data forms, with a summary of the salient validation results for each sample delivery group provided by the performing laboratory. Computer diskettes containing the raw data were processed and read into a database management system developed specifically for the estuarine study (see Data Management Plan, in ERLN and NOSC, 1991). All the chemistry data contained in the database system were completely verified by direct comparisons of the database printouts with the highlighted data forms. Any discrepancies noted were corrected to reflect the contents of the data-validation package.

METHODS

ANALYTICAL PROCEDURES

Analytes

The contaminants and the matrices that were analyzed are listed in table 3-10. Classes of organic compounds included volatile organic compounds (VOCs—only measured in seep water samples), polycyclic aromatic hydrocarbons (PAHs), pesticides, and polychlorinated biphenyls (PCBs). Inorganic analysis was conducted on crustal metals (aluminum (Al), iron (Fe), and Manganese (Mn)), toxic metals (silver (Ag), arsenic (As), cadmium (Cd), chromium (Cr), mercury (Hg), lead (Pb), copper (Cu), nickel (Ni), and zinc (Zn)), and the organotin compounds tributyltin (TBT), dibutyltin (DBT), and monobutyltin (MBT). The list of sample matrices and chemical groups analyzed is presented in table 3-11. The standard operating procedures for sample preparation, extraction, and quantification used for the chemical analyses are documented in Ceimic Corp. (1992) and Mueller et al. (1992). Sediment and tissue samples were stored fresh-frozen before chemical analysis. Summaries of the methods are given below.

Table 3-10. Target analytes, sample matrices, and target detection limits used for chemical analysis. (Abbreviations used in the text are given in parenthesis.)

(A) Organic Compounds

Analyte	Sample Matrix	Dry Weight for Sediment and Biota	
		Target Method Detection Limit	Achieved Method Detection Limit
Volatile Organic Compounds	seep water	0.1 µg/l	0.3 – 0.4 µg/l
vinyl chhloride	trans-1,3-dichloropropene		
1,1-dichloroethene	tetrachloroethene		
methylene chloride	chlorobenzene		
trans-1,2-dichloroethene	bromoform		
chloroform	1,1,2,2-tetrachloroethane		
1,1,1-trichloroethane	1,3-dichlorobenzene		
carbon tetrachloride	methyl-t-butyl ether		
1,2-dichloroethane	benzene		
trichloroethene	toluene		
1,2-dichloropropane	ethylbenzene		
bromodichloromethane	m,p-xylene		
2-chloroethylvinyl ether	o-xylene		
cis-1,3-dichloropropene	1,2-dichlorobenzene		
Polycyclic Aromatic Hydrocarbons	seep water	1–5 µg/l	1–4 µg/l
	sediment	1–5 ng/g	3–21 ng/g
	biota	10–20 ng/g	3–25 ng/g
anthracene (ANTH)	phenanthrene (PHEN)		
benz(a)anthracene (BAA)	C_1 alkyl phenanthrenes + anthracenes (C1)		
benzo(a)pyrene (BAP)	C_2 alkyl phenanthrenes + anthracenes (C2)		
benzo(e)pyrene (BEP)	C_3 alkyl phenanthrenes + anthracenes (C3)		
chrysene (CHRYSENE)	C_4 alkyl phenanthrenes + anthracenes (C4)		
dibenz(a,h)anthracene (DIBAHA)	pyrene (PYRENE)		
fluoranthene (FLUORAN)	benzo(g,h,i)perylene (BGHIPER)		
fluorene (FLUORENE)	indeno(1,2,3-cd)pyrene (INDEN123)		
perylene (PERYLENE)	sum of dibenzofluoranthenes (SUMBENZ)		
Chlorinated Pesticides	seep water	0.6 µg/l	0.6 – 0.9 µg/l
	sediment	0.6 ng/g	0.1 – 0.6 ng/g
	biota	0.6 ng/g	0.1 – 2.4 ng/g
aldrin (ALDRIN)	alpha-chlordane (ACHLOR)		
trans-nonachlor (TNONACHL)	Heptachlor (HEPCHLOR)		
Heptachlor epoxide (HEPEPX)	hexachlorobenzene (HCB)		
Lindane gamma-BHC (LINDANE)	Mirex (MIREX)		
o,p′-DDD (DDDOP)	p,p′-DDD (DDDPP)		
o,p′-DDE (DDEOP)	p,p′-DDE (DDEPP)		
o,p′-DDT (DDTOP)	p,p′-DDT (DDTPP)		
Polychlorinated Biphenyl Congeners [Congener number and position of chlorines]	seep water	1 µg/l	0.5 – 0.6 µg/l
	sediment	0.5 ng/g	0.1 – 1.9 ng/g
	biota	0.5 ng/g	0.2 – 0.6 ng/g
8 [2,4′] (PCB6)	18 [2,2′,5] (PCB18)		
28 [2,4,4′] (PCB28)	52 [2,2′,5,5′] (PCB52)		
44 [2,2′,3,5′] (PCB44)	66 [2,3′,4,4′] (PCB66)		
101 [2,2′,4,5,5′] (PCB101)	118 [2,3′,4,4′,5] (PCB118)		
153 [2,2′,4,4′,5,5′] (PCB153)	105 [2,3,3′,4,4′] (PCB105)		
138 [2,2′,3,4,4′,5] (PCB138)	187 [2,2′,3,4′,5,5′,6] (PCB187)		
128 [2,2′,3,3′,4,4′] (PCB128)	180 [2,2′,3,4,4′,5,5′] (PCB180)		
170 [2,2′,3,3′,4,4′,5] (PCB170)	195 [2,2′,3,3′,4,4′,5,6] (PCB195)		
206 [2,2′,3,3′,4,4′,5,5′,6] (PCB206)	209 [2,2′,3,3′,4,4′,5,5′,6,6′] (PCB209)		

(Contd)

Table 3-10. Continued.

(B) Inorganic Elements and Butyltins

Analyte	Sample Matrix	Dry Weight for Sediment and Biota: Target Method Detection Limit	Dry Weight for Sediment and Biota: Achieved Method Detection Limit
Aluminum (Al)	water	7.50 µg/l	84.0 µg/l
	sediment	Not Specified (NS)	10.7 µg/g
	biota	NS	8.17 µg/g
Arsenic (As)	water	3.0 µg/l	15.0 µg/l
	sediment	1.1 µg/g	0.52 µg/g
	biota	4.3 µg/g	3.2 µg/g
Cadmium (Cd)	water	0.2 µg/l	4.0 µg/l
	sediment	0.35 µg/g	0.13 µg/g
	biota	0.055 µg/g	0.05 µg/g
Chromium (Cr)	water	3.0 µg/l	15.0 µg/l
	sediment	3.2 µg/g	1.65 µg/g
	biota	0.3 µg/g	1.85 µg/g
Copper (Cu)	water	0.7 µg/l	300.0 µg/l
	sediment	1.3 µg/g	4.55 µg/g
	biota	5.0 µg/g	2.01 µg/g
Iron (Fe)	water	20.0 µg/g	90.0 µg/l
	sediment	NS	7.6 µg/g
	biota	NS	6.6 µg/g
Lead (Pb)	water	3.0 µg/l	1.5 µg/l
	sediment	1.2 µg/g	0.81 µg/g
	biota	0.6 µg/g	0.13 µg/g
Manganese (Mn)	water	0.5 µg/l	15.0 µg/l
	sediment	NS	0.97 µg/g
	biota	NS	0.60 µg/g
Mercury (Hg)	water	5.0 µg/l	0.6 µg/l
	sediment	0.007 µg/g	0.448 µg/g
	biota	0.04 µg/g	0.079 µg/g
Nickel (Ni)	water	3.0 µg/l	30.0 µg/l
	sediment	1.1 µg/g	2.76 µg/g
	biota	0.7 µg/g	3.45 µg/g
Silver (Ag)	water	3.0 µg/l	15.0 µg/l
	sediment	0.04 µg/g	0.15 µg/g
	biota	0.04 µg/g	0.091 µg/g
Tin (Sn)	water	3.0 µg/l	
	sediment	1.8 µg/g	0.81 µg/g
	biota	NS	
Zinc (Zn)	water	0.1 µg/l	1500.0 µg/l
	sediment	2.2 µg/g	1.1 µg/g
	biota	11.5 µg/g	11.13 µg/g
Butyltins	sediment	2.0 µg/g	2.0 µg/g
monobutyltin (MBT)	biota	2.0 µg/g	2.0 µg/g
dibutyltin (DBT)			
tributyltin (TBT)			
Total butyltin (SUMBT)			

Organic Compounds

VOCs. Samples were stored in 40-ml glass vials with no head space at 4°C until analysis. All VOC samples were extracted and analyzed within the holding time specified by the CLP statement of work (Ceimic Corp., 1991). The samples were analyzed for halogenated and aromatic

volatiles by gas chromatography (GC) using electrolytic conductivity and photoionization detectors in series according to EPA Method 8021 (USEPA, 1987).

Semivolatiles. The PAH, PCB, and pesticide fractions were obtained from homogenized samples by solvent extraction and separation by silica gel column chromatography. About 20–25 grams of wet sediment from the homogenized samples were extracted with 1:1 acetone: dichloromethane, treated with copper for sulfur removal, sonicated, and evaporated to 10 ml using a Kuderna-Danish solvent evaporator. About 20–25 grams of wet tissue homogenate were extracted with acetonitrile and solvent exchanged in hexane before column cleanup. Plant samples were extracted with dichloromethane using a Soxhlet solvent extractor (Ceimic Corp., 1992).

PAHs. The PAH fraction was eluted with hexane:methylene chloride (70:30), volume-reduced, and analyzed by GC/mass spectroscopy (MS). The internal standards, D_{10}-phenanthrene and D_{12}-perylene, were spiked at about 25 μg/g wet weight. The external standard was D_{10}-acenapthene at about 25 μg/g wet weight. The matrix spike solution consisted of a mixture of all the PAH target analytes (except for C_3-phenanthrenes+anthracenes and its C_4-analog) spiked at levels ranging from 0.33 to 3 times the sample concentration (Ceimic Corp., 1992).

PCBs. The PCB fraction was eluted with hexane, volume-reduced, and analyzed by GC/electron capture detection (ECD). The internal standards were PCB congener 198 and octachlornapthalene (OCN) spiked at 12.25 μg/g wet weight. The external standard was dibutylchlorindate (DBC) spiked at 25 μg/g wet weight. The matrix spike solution contained a mixture of the target PCB congeners and was spiked at concentrations ranging from 0.33 to 3 times the sample concentration (Ceimic Corp., 1992).

Pesticides. The pesticide fraction was eluted with hexane:methylene chloride (70:30), solvent-exchanged into hexane before silica gel cleanup, volume-reduced, and analyzed by capillary gas chromatography with ECD. The internal standard was gamma chlordane spiked at 12.25 μg/g wet weight. The external standard was dibutylchlorendate (DCB) spiked at 25 μg/g wet weight. The matrix spike solution contained a mixture of the target pesticides and was also spiked at concentrations ranging from 0.33 to 3 times the sample concentration (Ceimic Corp., 1992).

Inorganic Elements

Tissues. Tissue samples were prepared for trace metal analysis using a wet digestion technique. In this procedure, sample homogenates were placed in precleaned quartz or Teflon digestion vessels and weighed wet (7–10 grams). A titanium-tipped homogenizer was used for all tissue samples. A separate aliquot of tissue homogenate (1 gram) was used for dry-weight determinations. After wet-weight determinations, 30 ml of concentrated Baker Instra-Analyzed HNO_3 was added to each beaker containing the wet sample homogenate. Samples were allowed to cold-digest for up to 12 hours, and following this period, samples were placed on a hot plate and heated gently. Once samples stopped frothing, they were covered with Teflon watchglasses and refluxed with a more vigorous heating regime. After 12–15 hours, watchglasses were removed and samples were brought to near dryness. At this point, 10 ml of 1N HNO_3 was added to each vessel, along with 5 ml of 30 percent H_2O_2. Samples were refluxed at moderate heat until solutions became clear. Once clarity was achieved, samples were again brought to near dryness. After the samples had cooled, 50 ml of 1N HNO_3 was added to each digestion vessel.

Once the digested samples had completely redissolved, samples were filtered through acid-cleaned 0.4-µm Nuclepore membranes and dispensed into acid-cleaned high-density polyethylene (HDPE) storage bottles. Samples prepared in this fashion were then analyzed for metals using graphite furnace atomic absorption (GFAA) spectroscopy (for As, Cd, Pb, and Ag) or inductively coupled plasma (ICP) spectroscopy (for Al, Cr, Cu, Fe, Mn, Ni, and Zn) (Ceimic Corp., 1992).

Table 3-11. Chemical groups analyzed for sample matrices for the estuarine study.

Matrix	Organics					Metals	
	VOC	PAH	PCB	Pesticide	Organotin	Crustal	Toxic
Water							
Seep	X	X	X	X		X	X
River						X	X
Sediment							
Grabs		X	X	X	X	X	X
Cores		X	X	X		X	X
Biota							
Eelgrass							
Screen		X	X	X		X	X
Routine						X	X
Fucoid Algae		X	X	X		X	X
Mussels							
Indigenous		X	X	X	X	X	X
Deployed		X	X	X	X	X	X
Oysters		X	X	X		X	X
Flounder							
Fillet		X	X	X		X	X
Liver		X	X	X			
Lobster							
Tail		X	X	X		X	X
Hepatopancreas		X	X	X		X	X

Mercury in tissue samples was measured by cold vapor following the digestion procedure detailed in USEPA (1983). For Hg, a separate aliquot of the wet-tissue homogenate (2–3 grams) was weighed and then introduced into a biological oxygen demand (BOD) bottle. To the BOD bottle, 50 ml of dilute nitric acid was added, followed by 5 ml concentrated H_2SO_4, and 2.5 ml concentrated HNO_3. Samples were heated on a hot plate following reagent additions for 5–8 hours. After this period, samples were cooled and 15 ml of $KMnO_4$ was added, followed by 8 ml of $K_2S_2O_8$. Samples were returned to the hot plate and gently heated for an additional 12 hours. After this period, samples were cooled and 6 ml of a sodium chloridehydroxylamine sulfate solution was added to decolorize the sample. The sample was then brought to 100 ml final volume. Finally, a 10-ml aliquot of a stannous chloride solution was introduced to the sample, the sample was purged, and the resulting vapor stream was analyzed for mercury (Ceimic Corp., 1992).

Sediments. Sediment samples were analyzed for trace metals using GFAA spectroscopy (As, Cd, Pb, and Ag), ICP spectroscopy (Al, Cr, Cu, Fe, Mn, Ni, and Zn), or cold vapor (Hg) following a microwave-assisted total digestion procedure. In brief, the procedure entailed adding

approximately 0.5 gram of a homogenized wet sediment sample to a teflon digestion liner, followed by 1 ml of concentrated HNO_3 and HCl acids. The samples were allowed to cold-digest for up to 4 hours, and occasionally the samples were gently swirled to introduce acid to the entire sediment sample. Following cold digestion, 5 ml of concentrated HF was added to each sample. Samples were then capped, placed in special digestion vessels, and microwaved at various intensities for 4 hours using a CEM-Model 2000 Digestion System.[3] Following microwave digestion, the Teflon digestion liners were removed to a hot plate and the samples were brought to near dryness. At near dryness, 50 ml of 1N HNO_3 was added to redissolve each sample, and redissolved samples were filtered through acid-cleaned 0.4-µm Nuclepore membranes. Samples prepared in this fashion were then analyzed for metals (Ceimic Corp., 1992).

Water. Seawater samples collected around the Shipyard were acidified to pH 2 at the time of collection, so no attempt was made to differentiate between dissolved and particulate metal during the Phase I study. Metal concentrations for these seawater samples were measured directly using GFAA spectroscopy, ICP, or cold vapor. The concentrations reported for seawater samples reflect on acid-recoverable fraction of total metal in these samples.

Seep samples were prepared for metal analysis differently than seawater samples. In this procedure, 50-ml aliquots of seep water samples were dispensed into Teflon liners and 5 ml of concentrated HNO_3 was added to each sample. Seep samples were then microwaved with two microwave intensity regimes using a CEM-Model 2000 Digestion System. Metal levels in seep samples were measured by GFAA spectroscopy, ICP, or cold vapor, and the concentrations reported reflect an acid-recoverable fraction of total metal in these samples.

Organotins. Homogenized sediments and tissue samples were extracted with methylene chloride, derivatized with hexyl magnesium bromide, and analyzed by GC with a flame photometric detection. A five-point calibration curve was generated, with tripentyltin bromide as the internal standard. Sediment and tissue (if enough material was available) were analyzed in triplicate to determine the concentrations of TBT, DBT, MBT, and inorganic tin (Sn) (Stallard et al., 1989).

DATA ANALYSIS

Descriptive Statistics

Summary statistics were performed on the data set to identify outliers and determine the average and most probable value for the contaminants measured in the estuary. The sum of the measured PAH, PCB, and pesticide compounds was calculated for each sample. The total PCB concentrations for sediment and tissue samples were calculated using the following empirical relationships:

Sediment (NOAA, 1991a):

$$\text{Total PCB} = 2.01 \times (\text{SUMPCB}) - 1.55$$

Tissue (NOAA, 1991b):

$$\text{Total PCB} = 1.95 \times (\text{SUMPCB}) + 2.1$$

[3]The sediment microwave digestion used a five-step program that brought the pressure of the vessels to 30, 50, 80, and 120 psi using 70, 70, 80, 80, and 90% power, respectively. The samples were then examined for complete digestion; if they were not digested, the vessels were recapped and redigested using a two-step program that brought the pressure of the vessels to 30 and 60 psi using 90 and 100% power, respectively. This program was repeated as necessary to achieve complete digestion (Ceimic Corp., 1992).

where

Total PCB = sum of the concentrations of PCBs for each level of chlorination

SUMPCB = sum of the 18 congeners measured during this study

Replicate analyses were averaged to obtain sample means for each station (duplicate analyses were not used for these calculations). The mean, standard deviation of the mean, minimum, median, and maximum values were calculated for concentrations of metal elements, PAH, PCB, and pesticide compounds measured in sediment grabs, sediment cores, and indigenous mussels. The summary statistics were used to describe contaminant distributions in the estuary and facilitate comparisons with data sets from other estuarine and coastal areas.

Metal Enrichment

The degree of metal enrichment in surface sediments was evaluated for Fe, Mn, As, Cd, Cr, Cu, Ag, Pb, Hg, Ni, and Zn. A crustal-ratio model that relates the amount of metal in a sample to the amount of metal expected from crustal weathering was used to determine the degree of heavy metal enrichment in the lower Piscataqua River estuary sediments. The crustal-ratio model was developed from the analysis of a large database of sediment samples from the USEPA's Near Coastal Environmental Monitoring and Assessment Program, Virginian Province (W. Boothman, USEPA ERLN, personal communication).

Trace metals occur naturally in the marine environment from weathering of the earth's crust (Brown et al., 1989). Aluminum is a common crustal element that is a major component of the fine-grained silts and clays which have a very high capacity for adsorbing and complexing with trace metals. The fine-grain materials are a result of geochemical weathering and physical mixing processes, so that the naturally occurring trace metal concentration should be correlated with the naturally occurring Al concentration (Windom et al., 1989; Hanson et al., 1993; W. Boothman, USEPA ERLN, personal communication). The crustal-ratio model allowed metal concentrations measured in different sediment types, which can vary greatly in terms of size and composition (see Section 3.1), to be evaluated based on the amount of Al present. In addition, the geochemical relationship between Al and the composition of crustal material (sands and clays), and the lack of significant anthropogenic sources of Al contamination in the Piscataqua and Great Bay Estuary, allowed the crustal-ratio model to be used to determine the degree of heavy metal enrichment in the lower Piscataqua estuary. The degree of enrichment, or deviation from the expected metal concentration, indicates that there could be alternative sources of metal contributing to the observed distribution, presumably anthropogenic, but also possibly involving local geological mineral inputs or the atmospheric fall out of dust particles.

The crustal-ratio model consisted of a series of linear regressions which related the concentration of Al (percent g/g) in the sample to the concentration of metal in background sediments (W. Boothman, USEPA ERLN, personal communication). The regressions were developed from a statistical analysis of the Virginian Province data set that isolated background samples, eliminating samples that could be influenced by anthropogenic inputs or other sources of trace metal input. The resultant regressions, describing trace metal concentrations in natural, background sediments (W. Boothman, USEPA ERLN, personal communication), were applied to the Piscataqua and York River data set by plotting the predicted metal concentration obtained from the measured Al concentration on a scatter plot of measured metal to measured Al. Sediment samples were determined to be enriched if they were above an "upper bound" of the regression defined as twice the root mean square error term determined from the regression (i.e., >2 standard deviations above the regression line):

$$\text{Metal} = m \times \text{Al} + b + 2 \times \text{RMS}$$

where

Metal	=	metal concentration predicted
Al	=	percent Al measured in the sample
m	=	slope of the regression
b	=	intercept of the regression
RMS	=	root mean square error of the regression (i.e., 1 standard deviation)

The measure of enrichment was used to identify station locations with abnormally high concentrations of metals.

Toxicity Thresholds

The proximity of measured metal and organic contaminants to toxicity thresholds, reported in the scientific literature, was evaluated by comparing the measured concentrations to the effects range low (ER-L), effects range medium (ER-M), and apparent effects threshold (AET). The ER-L and ER-M are defined as the lower 10 percentile and median, respectively, of the toxic effects ranges reported from a review of the available literature (Long and Morgan, 1990). The AET is the apparent toxicity threshold, determined from bioassays and observations of benthic communities exposed to mixtures of contaminants, above which statistically significant biological effects always occur ($p < 0.05$) (Long and Morgan, 1990). The toxicity threshold values were used to identify station locations where sediment contamination levels could be toxic to marine organisms.

Core Profiles

The depth of heavy-metal contamination was developed by plotting metal contamination, obtained from the sediment core samples, with depth. The core profiles were used to compare surface contamination levels, evaluate evidence of past contaminant deposition, and identify candidate areas for deposition rate determination during Phase II (NCCOSC et al., 1994).

Biota Concentrations

Concentrations of contaminants in biota samples were used to evaluate the biological availability of contamination in the estuary. Chemical residue was used as a measure of exposure to determine the relative significance of contamination as well as to suggest possible sources. The significance of chemical contamination levels in mussels was evaluated with both deployed and indigenous mussels.

Deployed Mussels. Chemical contamination in deployed mussels was analyzed by ANOVA (balanced design) to determine if there were statistically significant differences in chemical residues between the predeployed mussels (mussels collected from the clean location) and the mussels deployed at stations in the estuary (see Section 3.11). The null hypothesis for each chemical was

> H_0: There is no difference in the chemical tissue concentration between the mussels deployed at different stations in the estuary or the predeployed mussels collected from a clean location.

If the null hypothesis was rejected ($p < 0.05$), a least significant difference test was computed to determine groups with statistically similar contaminant levels.

Indigenous Mussels. The significance of indigenous mussel contaminant levels was evaluated according to two grouping schemes (table 3-12). The first grouping scheme was based on *a priori* geographic and hydrographic knowledge of the estuary and consisted of groups of stations in Clark Cove, Back Channel (behind Seavey Island), Main Channel (along Seavey and Pierce Islands), Piscataqua River reference (upstream and downstream of Seavey Island and Spruce Creek), and York River reference (in York River, see figure 3-68). The second grouping scheme consisted of two groups: those stations around Seavey Island and those stations not around Seavey Island. The purpose of the analysis was to determine if there were any spatial contamination trends within the estuary. An ANOVA (unbalanced design with unequal sample sizes) was conducted for each of the heavy metals, for the sum of the measured PAHs, for the total PCB, and for the sum of the measured pesticides. The null hypothesis for each chemical was

> H_0: There is no difference in the chemical tissue concentration between the groups of mussel samples.

If the null hypothesis was rejected ($p < 0.05$), a least significant difference test was computed to determine groups with statistically similar contaminant levels.

Table 3-12. Station grouping used to evaluate spatial contamination trends in the Great Bay Estuary (see figures 2-8 and 3-68 for station locations).

Group	Station	Description
Clark Cove (CC)	3, 4, 5, 6, 7, 8	Stations located in Clark Cove Embayment on east side of Seavey Island, Portsmouth Harbor.
Back Channel (BC)	17, 18, 19	Stations located in the back channel on the north side of Seavey Island, Portsmouth Harbor.
Main Channel (MC)	9, 10, 10A, 12, 12A, 14	Stations located in the main channel south of Seavey Island, Portsmouth Harbor.
Piscataqua River reference (PR)	1,2	Downstream of Seavey Island at entrance to Portsmouth Harbor.
	15, 16	Upstream of Seavey Island at Route 1 bridge.
	11	South of Pierce Island, Portsmouth Harbor.
	20, 21	Spruce Creek, Kittery, ME.
York River (YR)	22, 23	York River Harbor, ME.
Great Bay (GB)	24, 25, 26, 27, 28	Upstream on Piscataqua River and in Little Bay, Dover, NH (figure 2–8).
Seavey	3, 4, 5, 6, 7, 8, 9, 10, 10A, 12, 12A, 17, 18, 19	Circumnavigating Seavey Island.
Non-Seavey	1, 2, 11, 14, 15, 16, 20, 21	Lower Piscataqua River.
	22, 23	York River Harbor.
	24, 25, 26, 27, 28	Upper Piscataqua River and Little Bay

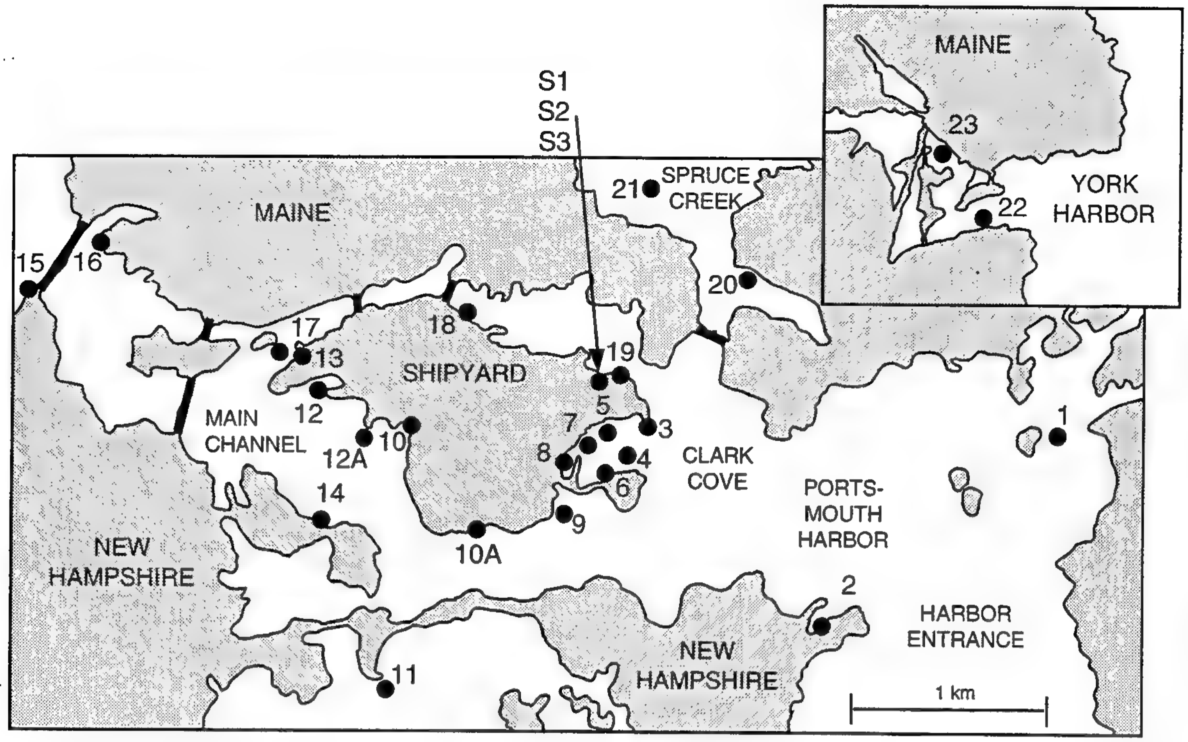

Figure 3-68. Station locations in lower Piscataqua River and York River estuaries. S1, S2, and S3 are seep sampling locations.

Background Mussel Residues. Indigenous mussel chemical concentrations were also evaluated by dividing tissue concentrations by the background concentration, determined from the measurements of predeployment mussels, and plotting the mussel tissue concentration levels in background units (BU). The BUs were obtained by

$$BU = C_t/B_t$$

where

C_t	=	indigenous mussel chemical tissue concentration
B_t	=	background chemical tissue concentration determined from the predeployed mussels

The resulting data were used to note any differences within groups and identify potential sources of contamination or possible outliers.

Other Biota. Tissue concentrations measured in lobster and winter flounder samples were converted to wet-weight contamination levels. The mean wet-weight concentrations were then compared to US Food and Drug Administration (FDA) action limits. Human health risks, including those from the consumption of seafood, were assessed using data presented in this report (E. Mahoney and Associates, 1993). Chemical concentrations measured in the other biota samples (eelgrass, algae, etc.) provided ancillary databases to help determine exposure levels, furnish data that could be evaluated by other investigators (see Sections 3.1 to 3.12), and develop a baseline for the long-term monitoring plan (NCCOSC et al., 1994).

RESULTS

DATA QUALITY EVALUATION

Performance Evaluation

The performance evaluation (PE) conducted by Ceimic Corp. consisted of blind analyses of sediment and biota (mussel) samples prepared by ERLN. The samples were analyzed for organic fractions (PAHs, PCBs, and pesticides) and inorganic elements (Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Ag, Sn, and Zn) (see table 3-10), along with the SRM and other quality control samples required by the QA/QC plan. Ceimic Corp. documented proficiency by obtaining comparable results for the blind analysis and achieving acceptable MDLs for the target analysis (table 3-10). See Appendix A in Munns et al. (1992) for a detailed evaluation of the PE and MDL study.

Analytical Screen

Upon completion of the PE, an intensive analytical screen was performed on a subset of 24 sediment samples, 3 blue mussel samples, 3 lobster samples (both tail and hepatopancreas tissue), 3 flounder samples (both flesh and liver tissue), 3 eelgrass samples (both leaf and root material), 3 fucoid alga samples, and 3 water samples collected from seeps draining from the Shipyard. The samples were analyzed for PAHs, PCBs, pesticides, and metals (table 3-10). In addition, the seep samples were analyzed for VOCs, and 24 sediment and 24 blue mussel samples were analyzed for organotin compounds. The purpose of the analytical screen was to help identify the analytes of concern, verify the appropriateness of the methods and techniques selected for use during routine analysis, develop data and information on the performance criteria of the analytical methods, and demonstrate proficiency for the analysis of matrices sampled in the estuary. The analytical screen results showed that methods selected were capable of meeting the data quality objectives of the estuarine study. However, during a routine analysis of the samples, some problems were encountered that interfered with the analytical accuracy desired. These inaccuracies were documented for the data set reported here (see Appendix L). A detailed presentation of the analytical screen results is reported in Munns et al. (1992). On the basis of the analytical screen findings, the ecological QA/QC plan was updated to correct any deficiencies noted and to implement improvements in sample analysis and data reporting procedures. A routine analysis of the remaining samples was then completed.

Field Collections

During the field collection of samples, attempts were made to obtain extra material to be archived and, if necessary, for reanalysis (ERLN and NOSC, 1991). At each station, four replicate samples (e.g., sediment grabs, mussel, and eelgrass collections) were collected and composited by subsampling the replicates. Replicate and composite samples were archived for each station and sample matrix. A similar approach was followed for the collection of lobster, fish, and fucoid algae samples (see ERLN and NOSC, 1991). Some tissue samples, particularly lobster hepatopancreas and flounder liver tissues, were of insufficient size and had to be composited between stations, or were not analyzed for certain chemical classes (e.g., metals). Nevertheless, sufficient sample material was obtained for the analysis of all chemical classes on each of the desired sample matrices (table 3-11).

Validated Results

The entire set of validated results is tabulated in Appendix L. Seep sample concentrations of halogenated and aromatic VOCs were lower than detectable levels for all VOCs analyzed

(Appendix L.1). The sample identification number, collection date, collection time, station location, percent water or solid content of the sample, concentrations of chemical compounds, and data flags are tabulated for PAH compounds (Appendix L.2), PCB congeners (Appendix L.3), pesticide compounds (Appendix L.4), and metals (Appendix L.5). Concentrations of total recoverable metals measured in water samples are presented in Appendix L.6, and concentrations of organotin compounds measured in mussel tissue and sediment samples are presented in Appendix L.7.

In Appendix L, the concentration and appropriate data validation flags are presented for each analyte. The data qualifier codes were used to indicate that the result was obtained under less than optimal accuracy. In all cases, every attempt was made to obtain the most accurate result possible (e.g., the sample in question was reextracted and reanalyzed). However, interferences from the marine sample matrices, low- to trace-concentrations of the analytes of interest, and imperfections in the sampling and analysis procedures all contributed to the varying degrees of uncertainty indicated by the qualifier codes used. A description of the data flags is given in table 3-13.

Table 3-13. Data qualifier codes used for the estuarine study.

(A) Organics and Inorganics

Code	Description
a	Analyte was not detected below the MDL shown.
b	Reported value was below the LOQ.
c	Not reported due to matrix interference.
d	Not quantified.
e	Not reported.
f	Reported value was below the MDL.
h	Quantification was based on alternate internal standard.
j	Analysis was performed with selected ion monitoring.
p	Value shown may be biased because recovery of the analyte in reference material was outside the desired range.
u	Analyte was not detected at the instrument detection limit.

(B) Inorganics (additional flags allowed)

Code	Description
n	The spike recovery was out of control.
s	The sample was analyzed by method of standard addition.
w	The analytical spike was outside of 85–115% recovery range.
*	The duplicate was out of control.
+	The standard addition correlation was less than 0.995.

Intercalibration Results

The samples used to intercalibrate PAH, PCB, pesticide, and metal compounds included sediment grab, sediment core, mussel, oyster, flounder (flesh and liver), and lobster (tail and hepatopancreas) samples (table 3-14). The purpose of the interlaboratory calibration was to provide an independent check on the accuracy of the analysis. The evaluation criteria used for the intercalibration samples were that the results were within a factor of three and that less than

20 percent of analytes were outside the desired limit (MESO and ERLN, 1992). Variations between laboratories, the inhomogeneity of the samples, and the relatively low concentrations of many of the analytes (below the limit of quantification (LOQ) and MDL) contributed to differences in sample results obtained by the participating laboratories. Overall the calibration results were very good for metals, satisfactory for PAH, PCB, and pesticides, and acceptable to the QA/QC reviewers.[4] However, isolated instances of discrepancies were detected for particular analytes and matrices. Problems were encountered for detection limits obtained for pesticide compounds; these limits sometimes varied by an order of magnitude or more. In addition, the quantification of PCB congeners sometimes resulted in improbable levels of individual congeners. Nevertheless, all other QA/QC criteria were satisfied. Gross differences between the laboratories would have indicated that corrective action was necessary.

Table 3-14. List of samples used for the interlaboratory calibration (see Appendix L for data results).

EPAID	Replicate	Station	Sample
110003	A	3	Sediment Core
110010	B	10	Sediment Core
110017	C	17	Sediment Core
110021	B	21	Sediment Core
110214	C	14	Sediment Grab
110215	C	15	Sediment Grab
110225	B	8	Sediment Grab
110226	B	7	Sediment Grab
110061	B	28	Oyster
110065	A	31	Oyster
110156	C	3	Lobster Hepatopancreas
110156	D	3	Lobster Tail Flesh
110181	A	5	Flounder Flesh
110390	A	1	Mussel
110393	A	23	Mussel
110397	A	18	Mussel
110400	A	12A	Mussel
110401	A	1	Mussel
110404	A	19	Mussel
110405	A	18	Mussel
798951	A	2	Postdeployment Mussel
798957	A	8	Postdeployment Mussel

SEDIMENT RESULTS

Sediment Grabs

Surface sediment grabs were obtained from Stations 1–21 in the lower Piscataqua River estuary and at Stations 22 and 23 in the York River Harbor (figure 3-68). Four replicate samples were obtained for each location and used to create a composite sample for chemical analysis (see

[4] Copies of the interlaboratory calibration report can be obtained by contacting the lead author.

Section 3.1). Individual replicates from Stations 7, 8, 10, 17, and 19 were analyzed to provide a measure of contaminant variability at those stations (Appendix L).

Metals. A summary of heavy metal contamination in surface sediment grabs is presented in table 3-15 (Appendix L.5). The results of the enrichment analysis are shown in figures 3-69 – 3-79. For the metal enrichment figures, the x-axis is the concentration of Al (in percent dry weight g/g) measured in the sample, the y-axis is the concentration of metal in the sample, the lower diagonal line is the predicted metal concentration from the crustal-ratio model, and the upper diagonal line is the upper bound of the prediction (2 standard deviations greater than predicted). Each data point is labeled with the station location number, and the area of the estuary sampled is identified for those stations which were enriched.

The validity of the crustal-ratio model was demonstrated by the relatively good fit of the Al–Fe (figure 3-69) and Al–Mn (figure 3-70) relationships, which showed that only one station was above the upper bound for Fe (figure 3-69). Iron and manganese provide a basis for evaluating the validity of the crustal- ratio model because the Fe and Mn distributions are dependent on the same sedimentary and geochemical processes that affect all crustal elements and the Fe and Mn distribution are not as affected by noncrustal inputs (e.g., anthropogenic sources) as are trace metals. Metal concentrations which were outside of the upper bound, statistically defined as twice the mean square error of the Al–metal regression, were classified as enriched, suggesting that metal sources other than crustal weathering were present (e.g., anthropogenic inputs). Although the enrichment model was derived from samples from the Virginian Province and lacks information on Al–metal relationships specific to the Piscataqua River and Great Bay Estuary, the model provides a basis for evaluating sediment metal contamination levels in the estuary.

In addition to enrichment levels, figures 3-71–3-79 also show sediment concentrations above toxicity thresholds for ER-L, ER-M, and AET levels where appropriate. A summary of the results obtained from the metal analysis of surface sediment grabs is presented below.

Arsenic concentrations averaged 10.5 μg/g and ranged from 0.27 to 28.70 μg/g. About 40% (9/23 stations) of the stations sampled had enriched levels of As, with the highest concentrations being measured in Clark Cove (2 times the upper bound) and in the main channel south of Seavey Island. Toxicity thresholds were not exceeded at any of the stations (figure 3-71).

Cadmium concentrations ranged from about 0.06 μg/g to the maximum of 2.0 μg/g measured at Station 18 (figure 3-72). Enriched levels of Cd, more than 5 times the predicted upper bound, were detected in Clark Cove and greater than 10 times the upper bound at a station in the Back Channel (Station 18). All Cd concentrations were far below toxicity threshold levels (figure 3-72).

Chromium was enriched at most stations (74%), with the exception of the reference stations in York River (Stations 22 and 23), Piscataqua River (Stations 1, 14, and 16), and Spruce Creek (Station 20). The Clark Cove stations had enrichment levels greater than 3 times the upper bound, and the Seavey Island Main Channel and Back Channel stations had enrichment levels 2 times the upper bound. Chromium concentrations exceeded the ER-L and ER-M toxicity thresholds in Clark Cove (figure 3-73).

Table 3-15. Descriptive statistics for inorganic elements (µg/g) measured in surface sediment grabs and sediment cores. Concentrations of butyltins (ng/g) measured in surface sediment.

(A) Sediment grabs (n=23)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	31,240.0	13,800.0	11,200.00	30,980.0	77,900.0
As	10.48	7.30	0.27	10.55	28.7
Cd	0.41	0.43	0.06	0.27	2.0
Cr	84.01[a]	49.05	21.70	75.30	211.0[b]
Cu	28.79	24.84	0.99	22.50	91.1[a]
Fe	193,000.0	89,500.4	54,500.0	17,900.0	40,000.0
Pb	53.66[a]	33.38	0.12	55.60[a]	122.0[b]
Mn	268.42	106.05	73.60	265.00	526.0
Hg	0.21[a]	0.11	0.09	0.19[a]	0.58[a]
Ni	20.60	9.28	7.50	19.90	39.3[a]
Ag	0.47	0.30	0.11	0.37	1.1[a]
Zn	92.84	77.04	17.30	76.90	378.0[a]

(B) Sediment cores (n=40)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	31,900.0	12,690.0	11,000.0	30,750.0	72,700.0
As	9.32	4.23	2.20	9.25	18.3
Cd	0.52	0.31	0.07	0.52	1.1
Cr	126.66[a]	75.55	32.40	117.00[a]	335.0[b]
Cu	68.29	114.95	0.46	26.75	531.0[b]
Fe	27,870.0	13,480.00	11,100.00	23,150.00	80,700.0
Pb	79.17[a]	83.66	11.50	52.50[a]	422.0[b]
Mn	284.68	90.88	154.00	269.50	519.0
Hg	0.28[a]	0.28	0.12	0.22	1.9[b]
Ni	32.21	17.40	11.10	28.20	91.2[b]
Ag	0.52	.32	0.12	0.48	1.3[a]
Zn	188.79[a]	317.91	33.40	108.00	1,950.0[c]

(C) Sediment concentrations butyltins (n=12)

Chemical	Mean	SD	Minimum	Median	Maximum
SUMBT	26.0	9.6	13.0	26.5	63.0
MBT	13.8	3.0	7.0	14.0	21.0
DBT	8.4	2.5	5.0	9.0	14.0
TBT	3.5	7.0	0.0	1.0	37.0

[a]Concentration above ER-L.
[b]Concentration above ER-M.
[c]Concentration above AET.

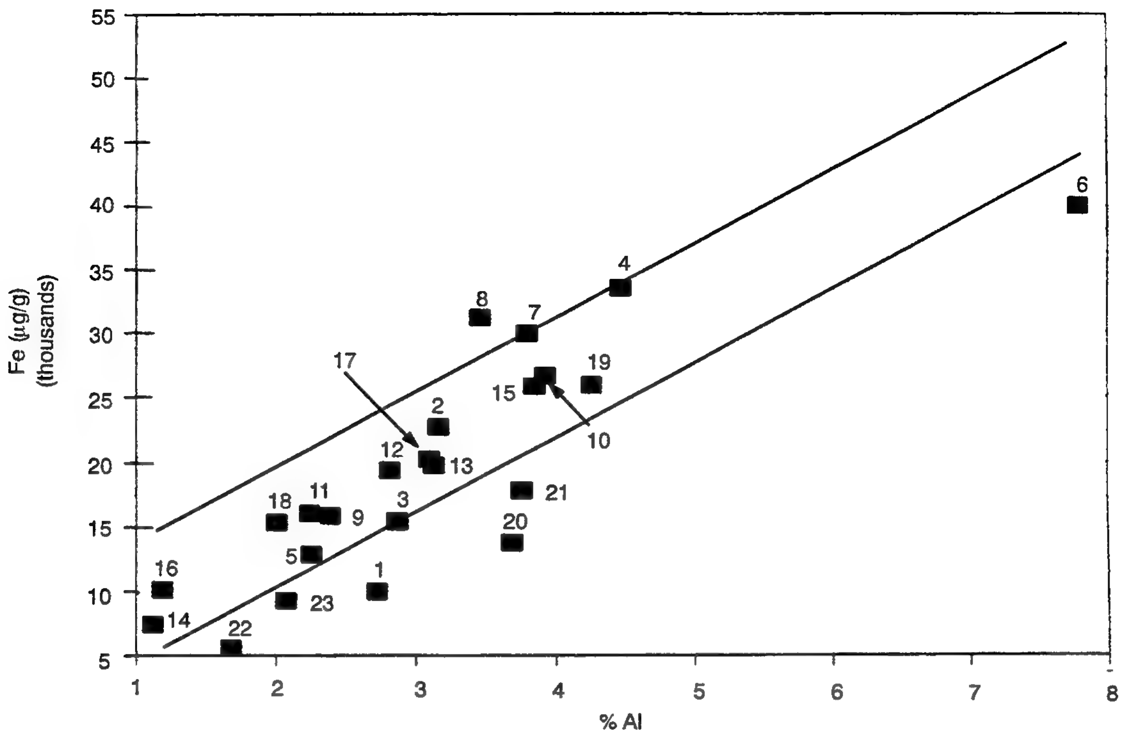

Figure 3-69. Scatter plot of Fe and percent Al measured in sediment samples from the lower Piscataqua River. For figures 3-69–3-79, the lower diagonal line is the predicted metal concentration from the crustal-ratio model and the upper line is the statistically determined upper bound of the prediction. Station location numbers are labeled.

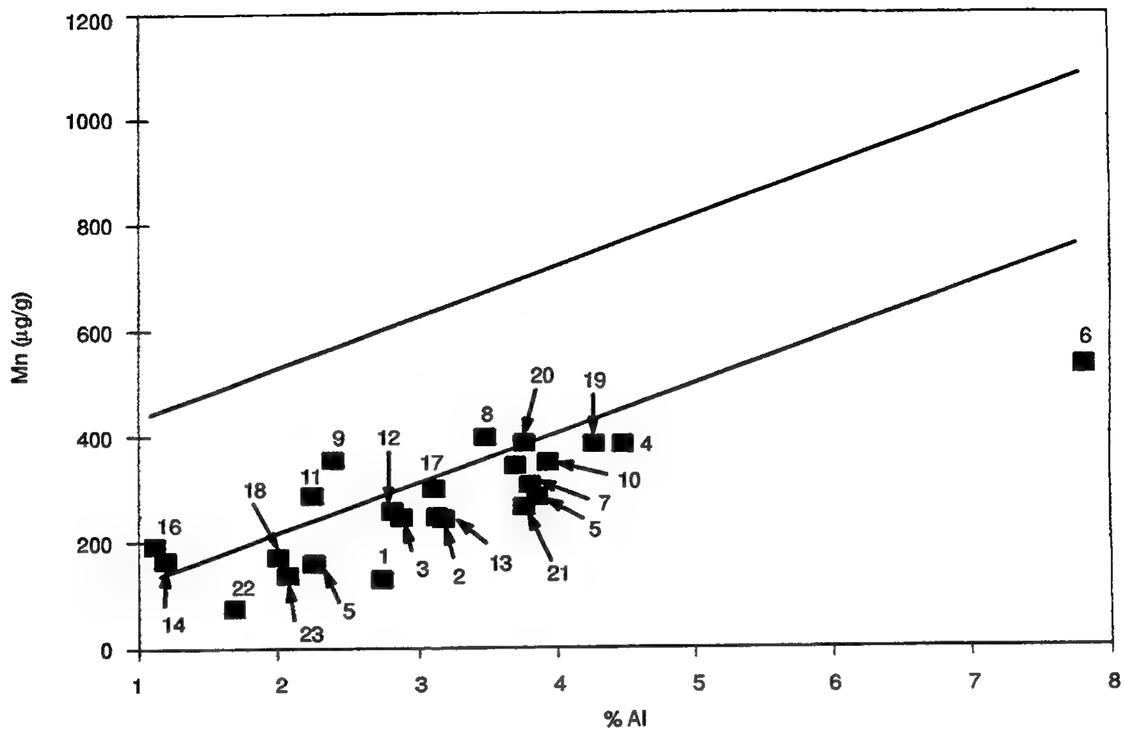

Figure 3-70. Scatter plot of Mn and percent Al measured in sediment samples from the lower Piscataqua River.

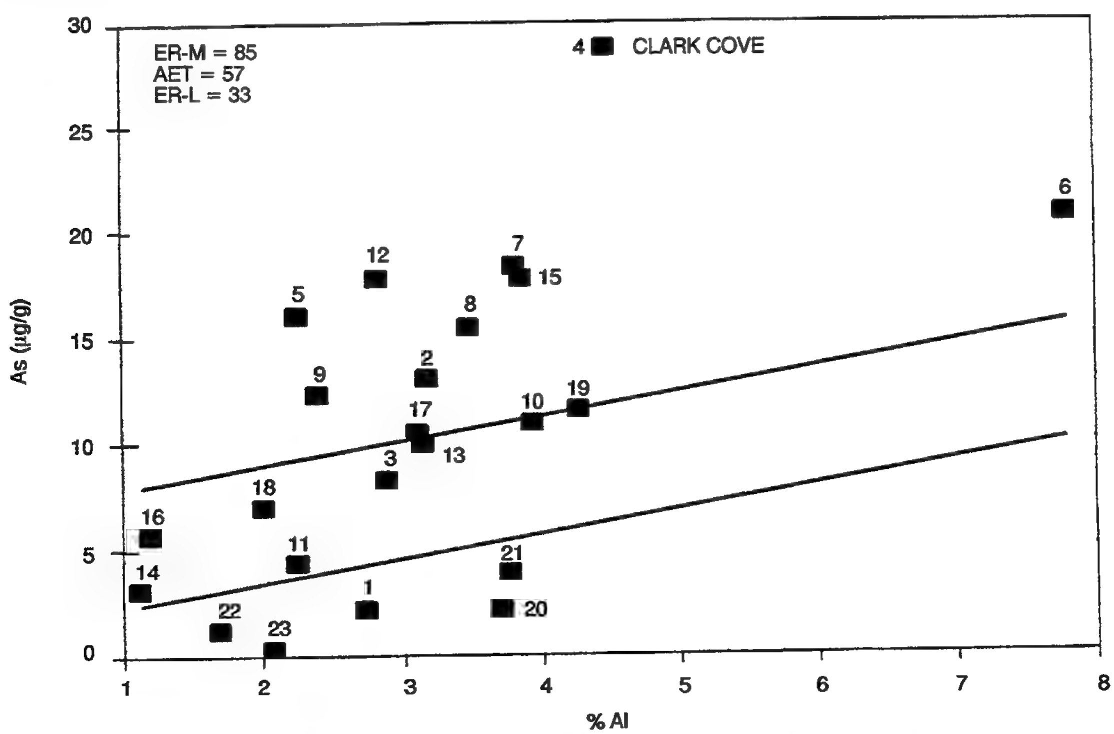

Figure 3-71. Scatter plot of As and percent Al measured in sediment samples from the lower Piscataqua River. For figures 3-71–3-79, the ER-L, ER-M, and AET toxicity thresholds for metals are shown, as appropriate.

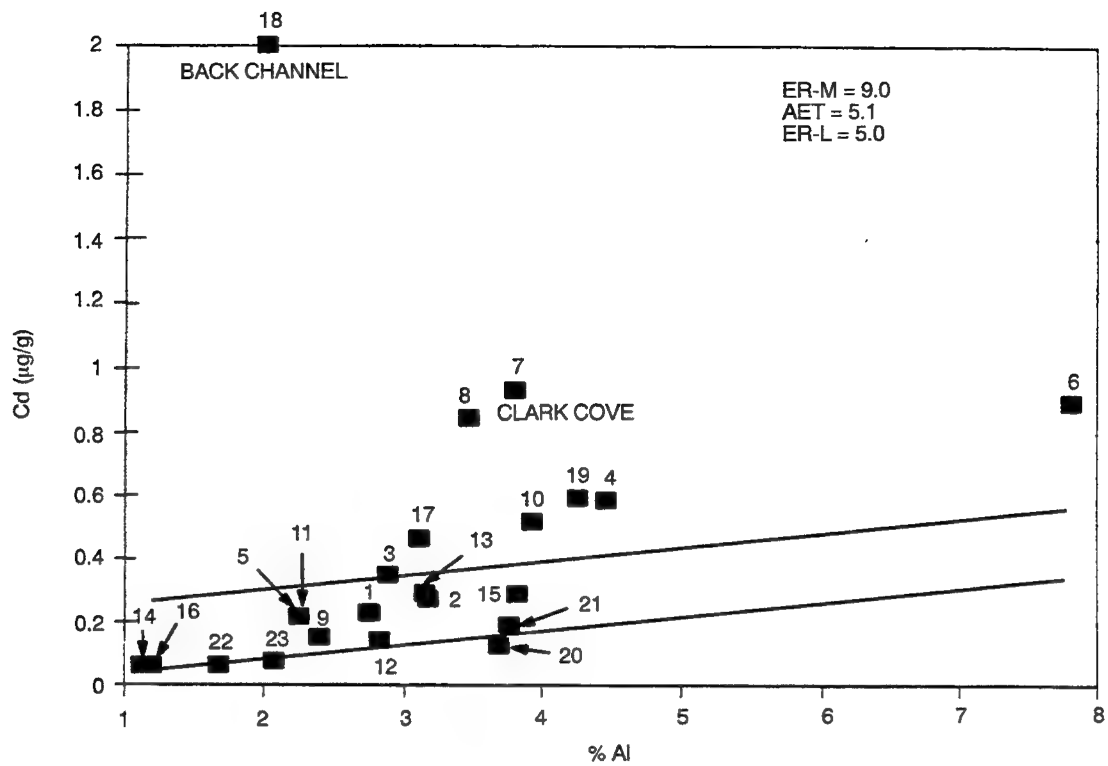

Figure 3-72. Scatter plot of Cd and percent Al measured in sediment samples from the lower Piscataqua River.

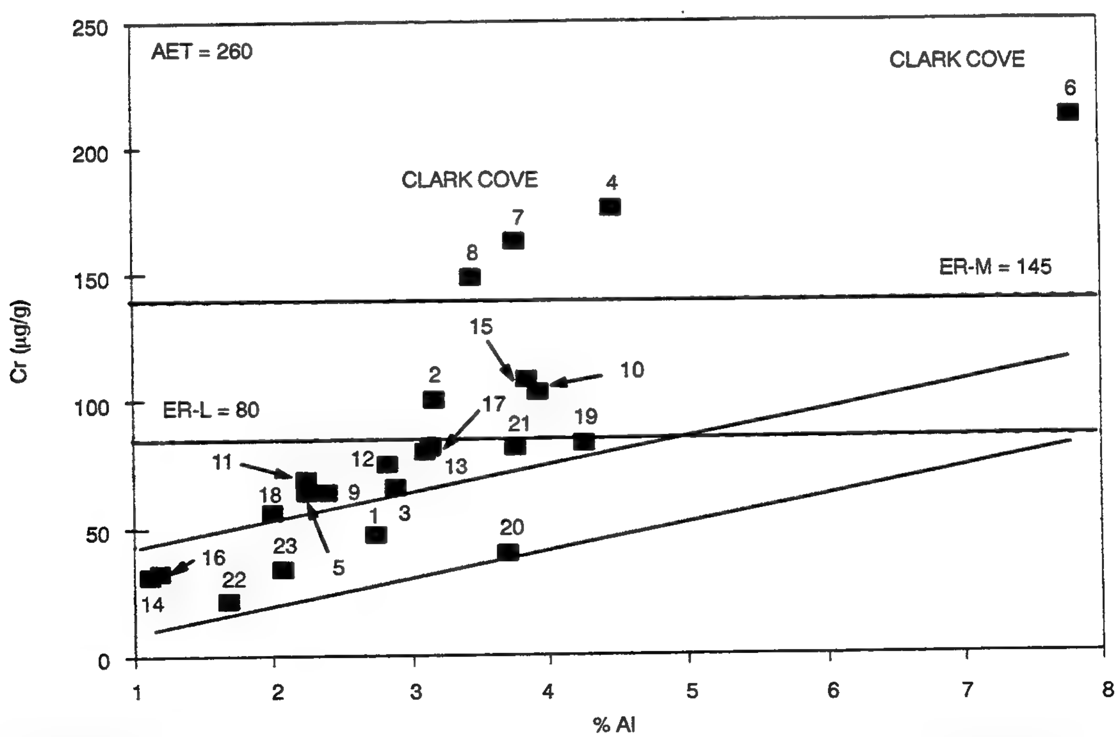

Figure 3-73. Scatter plot of Cr and percent Al measured in sediment samples from the lower Piscataqua River.

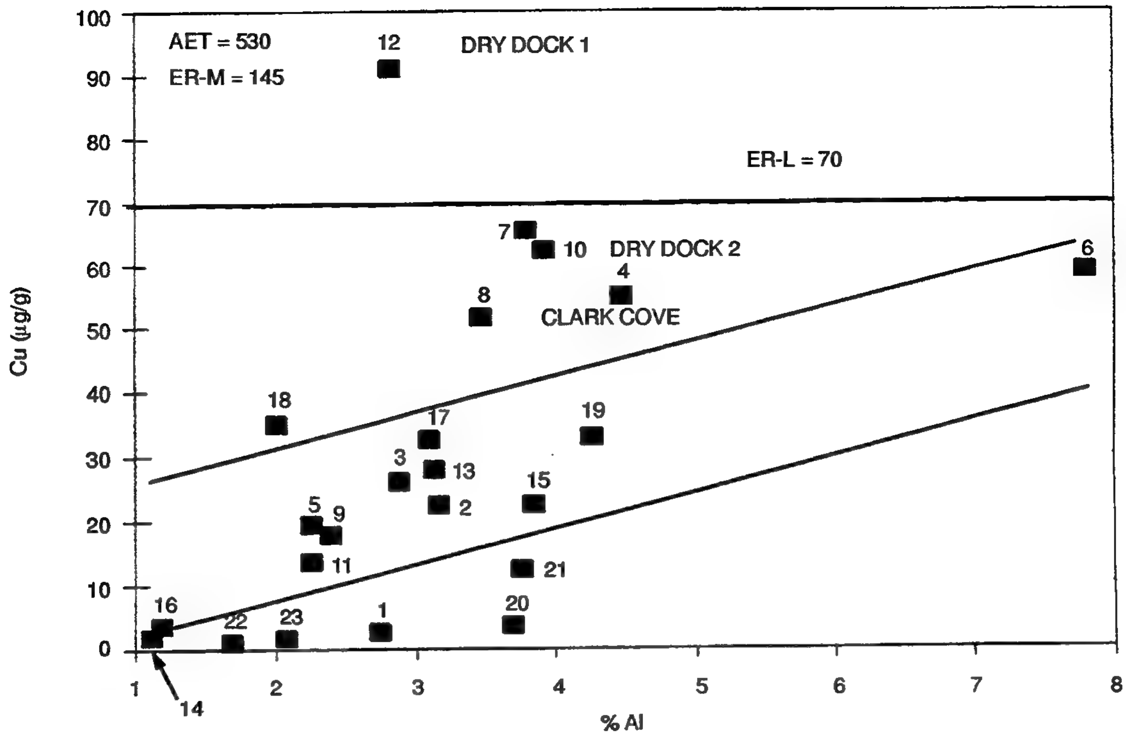

Figure 3-74. Scatter plot of Cu and percent Al measured in sediment samples from the lower Piscataqua River.

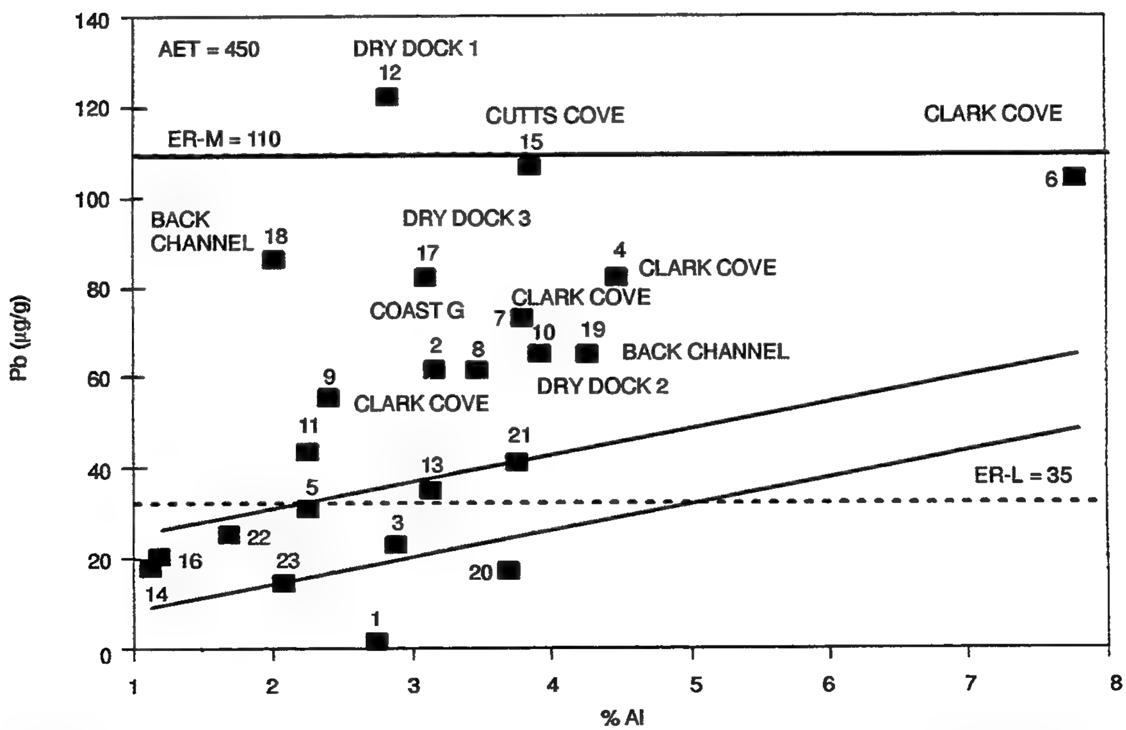

Figure 3-75. Scatter plot of Pb and percent Al measured in sediment samples from the lower Piscataqua River.

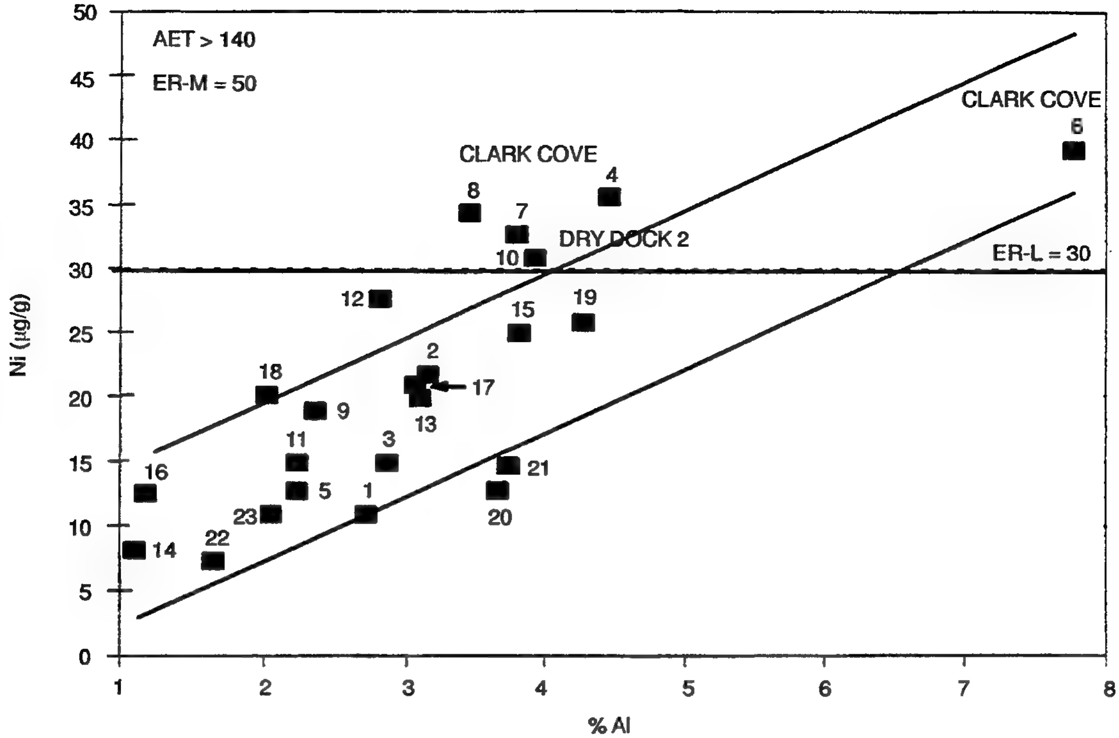

Figure 3-76. Scatter plot of Ni and percent Al measured in sediment samples from the lower Piscataqua River.

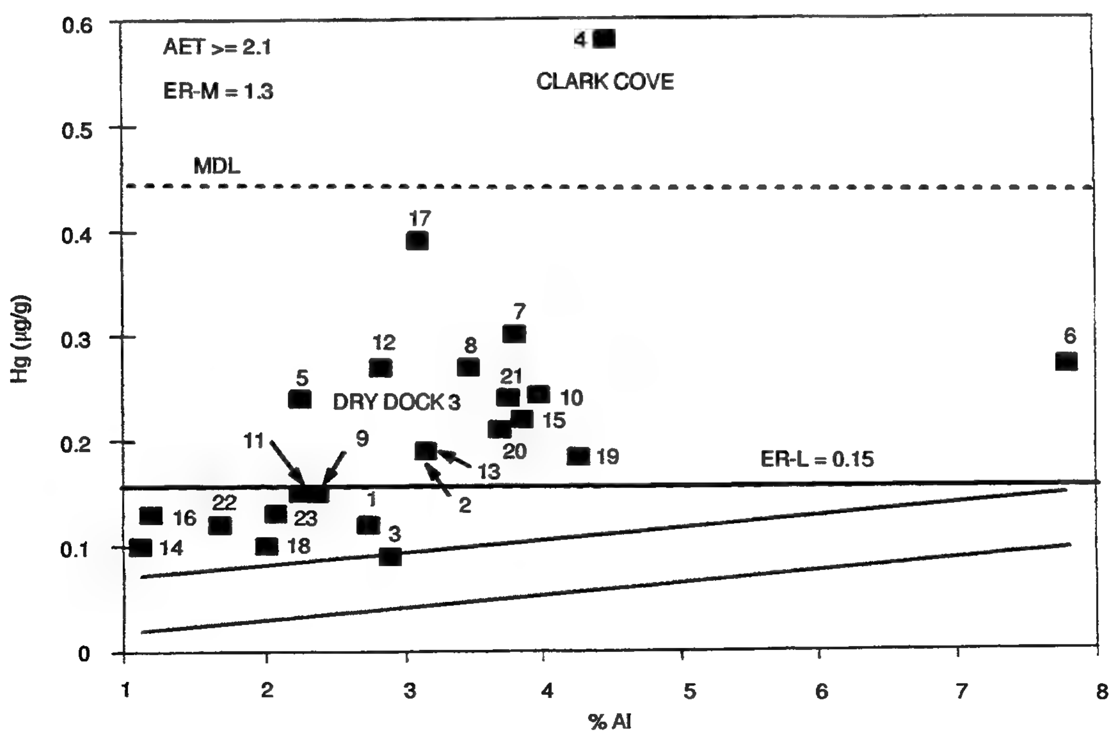

Figure 3-77. Scatter plot of Hg and percent Al measured in sediment samples from the lower Piscataqua River. The MDL of 0.45 µg/g is shown to indicate uncertainty in the low Hg concentrations.

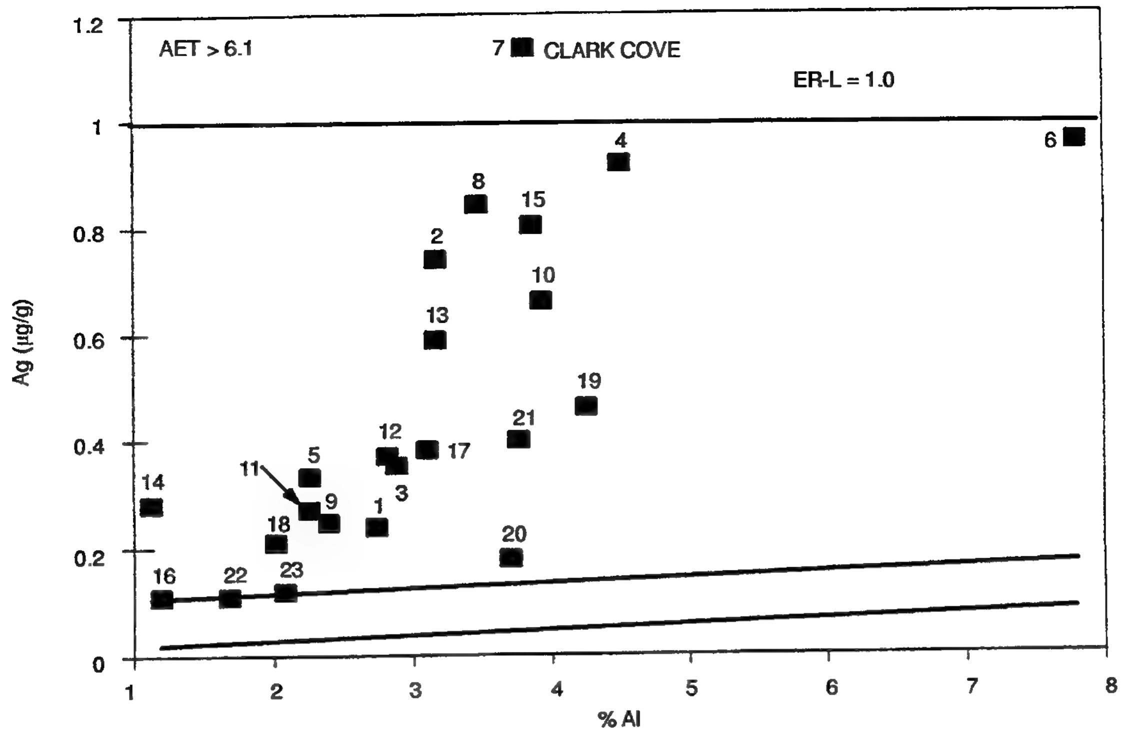

Figure 3-78. Scatter plot of Ag and percent Al measured in sediment samples from the lower Piscataqua River.

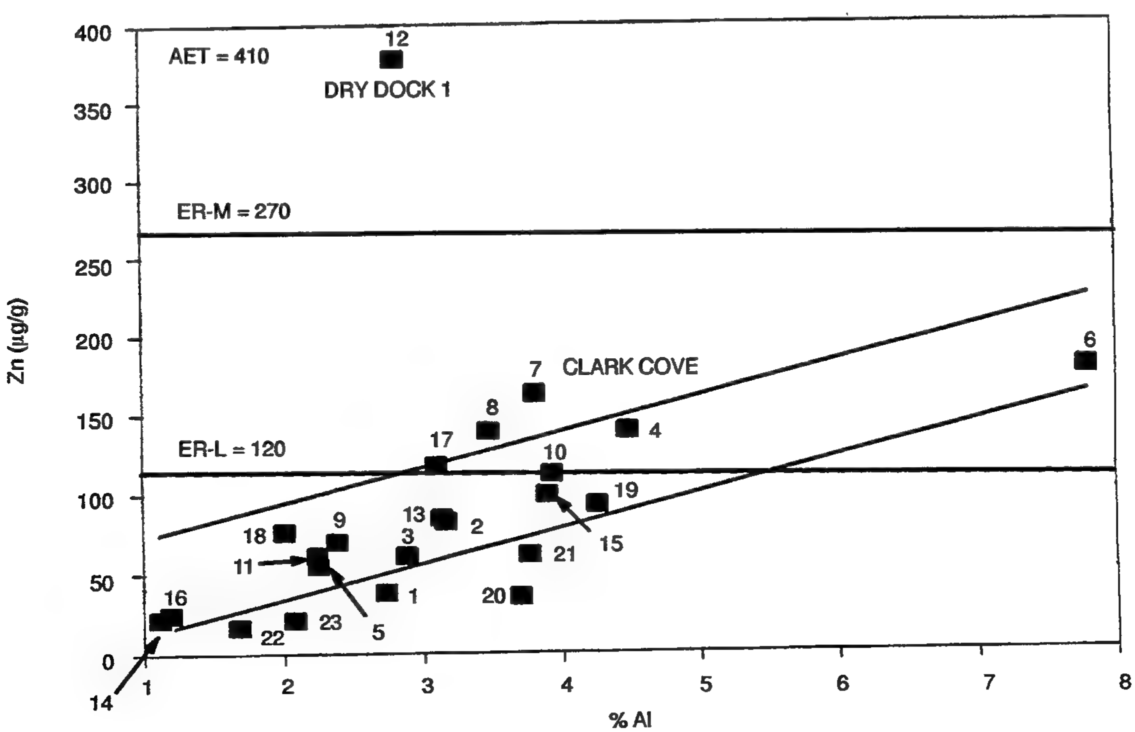

Figure 3-79. Scatter plot of Zn and percent Al measured in sediment samples from the lower Piscataqua River.

Copper concentrations ranged from <0.10 to about 90 μg/g. Copper concentrations were enriched at stations in Clark Cove (Stations 4, 7, and 8) and Dry Docks 1 and 2 (Stations 12 and 10, respectively). The Cu level was greater than ER-L of 70 μg/g at Dry Dock 1 (Station 12) (figure 3-74).

Lead concentrations were highly enriched (>3 to 5 times the upper bound) around Seavey Island, ranging from below 20 μg/g to 120 μg/g. Highly enriched concentrations exceeding the ER-L toxicity threshold (35 μg/g) were detected for stations in Clark Cove (Stations 4, 6, 7, and 8), near the dry docks (Stations 10, 12, and 17), in the Back Channel (Stations 18 and 19), as well as the Coast Guard (Station 2) and Cutts Cove (Station 15) stations. The ER-M toxicity threshold of 110 μg/g was exceeded at Dry Dock 1 (Station 12) (figure 3-75).

Nickel concentrations ranged from about 10 μg/g to 35–40 μg/g. Slightly enriched Ni concentrations above the ER-L toxicity threshold (30 μg/g) were measured at stations in Clark Cove (Stations 5, 6, 7, and 8) and Dry Dock 2 (Station 10) (figure 3-76).

The Hg enrichment analysis was hampered by the fact that most of the Hg concentrations measured were below the MDL of 0.45 μg/g (Appendix L.5). Figure 3-77 is shown to report the data obtained (see Appendix L.5 for qualifier codes). The ER-L toxicity threshold (0.15 μg/g) was exceeded at stations in Clark Cove (Stations 4, 5, 6, 7, and 8), near the dry docks (Stations 10, 12, and 17), in the Back Channel (Station 19), and Spruce Creek (Stations 20 and 21). However, even the highest Hg concentrations (0.6 μg/g at Station 4) were well below the ER-M and AET toxicity thresholds (figure 3-77).

Silver concentrations were enriched at all stations, and 48% of the stations were higher than 2 times the upper bound of crustal-ratio prediction. Silver levels measured at the Clark Cove stations were greater than 5 times the upper bound. However, only one station in Clark Cove (Station 7) exceeded the 1.0 μg/g ER-L toxicity threshold (figure 3-78).

Zinc concentrations ranged from below 50 μg/g to about 200 μg/g, with the highest Zn level measured at Dry Dock 1 (Station 12) which exceeded 350 μg/g. Overall, Zn concentrations were not enriched, although there were enriched Zn levels above the ER-L toxicity threshold (120 μg/g) in Clark Cove (Stations 7 and 8) and above the ER-M toxicity threshold (270 μg/g) at Dry Dock 1 (figure 3-79).

Organics. Overall organic contamination levels in surface sediments were relatively low. Many of the pesticide and PCB compounds were present at levels below the trace level detection limits achieved for the study. The descriptive statistics for PAHs, PCB congeners, and pesticide compounds are summarized in tables 3-16, 3-17, and 3-18, respectively. Concentrations of PAH and PCB contaminants at most of the stations were below ER-L toxicity thresholds; only one station exceeded ER-M toxicity levels (Station 18 exceeded ER-M for PHEN, see below); and all stations were below AET values (table 3-16A). The sum of the measured PAHs (SUMPAH) ranged from 298 to 13,880 ng/g, with an average of 4,898 ng/g (table 3-17A). The most abundant PAHs were the sum of benzofluoranthenes (SUMBENZ), fluoranthene (FLUORAN), and PYRENE, which averaged 725, 612, and 550 ng/g, respectively (table 3-16A; see table 3-10 for definition of abbreviations used). On average, FLUORENE, phenanthrene (PHEN), anthracene (ANTH), fluoranthene (FLUORAN), PYRENE, and benz(a)anthracene (BAA) measured in sediment surface grabs exceeded ER-L toxicity thresholds, and the maximum concentration of PHEN (1,600 ng/g) exceeded the ER-M toxicity threshold (1,380 ng/g) (table 3-16A).

The relative distribution and relationship to ER-L and AET toxicity thresholds of FLUORAN, PYRENE, PHEN, CHRYSENE, BAP, BAA, ANTH, FLUORENE, and DIBAHA are shown in figures 3-80–3-88, respectively. The highest PAHs were consistently measured at three stations: Dry Dock 1 (Station 12), Back Channel (Station 18), and the Coast Guard site (Station 2) (figures 3-80–3-88). Except for these three stations, where the PAH levels always exceeded ER-L toxicity thresholds, the remaining stations were at or below the ER-L levels (figures 3-80–3-88). Only the concentration of PHEN (1,600 ng/g) at Station 18 exceeded the ER-M (1,380 ng/g) (figure 3-82). The amount of TOC which can be used to normalize organic contamination levels ranged from 0.3% to 3.4% for the surface sediment grab samples (see Section 3.1). The TOC calculated for Stations 12, 18, and 2—0.9%, 1.5%, and 1.8%, respectively—was not correlated to the high PAH concentrations measured at those stations.

The concentration of TOTALPCB ranged from 60 to 470 ng/g, and averaged about 185 ng/g (table 3-17). The most abundant congeners were PCB153 and PCB138, which averaged 2.5 and 2.0 ng/g, respectively. The highest concentrations of TOTALPCB were measured at Stations 7 and 8 (in Clark Cove), Station 12 (Dry Dock 2), Station 15 (Cutts Cove), and Station 18 (Back Channel). The ER-L toxicity threshold for TOTALPCB (50 ng/g) was exceeded at seven stations; however, TOTALPCB concentrations were well below the ER-M (440 ng/g) and AET (1,000 ng/g) toxicity thresholds at every station sampled (figure 3-89).

Table 3-16. Descriptive statistics for PAH compounds (ng/g) measured in surface sediment grabs, sediment cores, and indigenous mussels. For each PAH compound, the mean, standard deviation of mean, minimum, median, and maximum values are presented.

(A) PAH compounds measured in sediment grabs (*n*=21)

Chemical	Mean	SD	Minimum	Median	Maximum
FLUORENE	46[a]	57	5	31	250[a]
PHEN	380[a]	425	12	275[a]	1,600[b]
ANTH	158[a]	175	4	103[a]	650[a]
C1	317	304	8	215	1,300
C2	225	193	10	183	740
C3	101	92	13	71	370
C4	86	178	18	28	840
FLUORAN	612[a]	504	32	570	1,800[a]
PYRENE	550[a]	411	30	560[a]	1,500[a]
BAA	296[a]	224	17	297[a]	800[a]
CHRYSENE	330	303	12	320	1,300
SUMBENZ	725	539	44	765	2,100
BEP	242	164	14	272	580
BAP	346	239	18	367	860[a]
PERYLENE	105	68	8	112	250
INDEN123	177	116	5	187	430
DIBAHA	46	30	7	44	120[a]
BGHIPER	148	93	3	167	310
SUMPAH	4,897	3,804	298	4,730	13,880

(Contd)

Table 3-16. Continued.

(**B**) PAH compounds measured in sediment cores (*n*=41)

Chemical	Mean	SD	Minimum	Median	Maximum
FLUORENE	59[a]	68	2	37a	280[a]
PHEN	528[a]	1,004	1	240a	6,200[c]
ANTH	219[a]	338	4	95a	1,900[b]
C1	499	661	6	280	3,200
C2	406	569	8	250	3,200
C3	161	205	12	98	1,100
C4	34	29	12	25	170
FLUORAN	1,083[a]	2,240	1	480	14,000[b]
PYRENE	1,008[a]	1,699	1	520a	10,000[b]
BAA	429[a]	605	6	240a	3,600[c]
CHRYSENE	437	572	6	280	3,200
SUMBENZ	997	1,116	2	720	5,200
BEP	361	394	6	300	1,900
BAP	470[a]	521	6	340	2,300
PERYLENE	203	212	6	150	860
INDEN123	179	166	6	150	650
DIBAHA	56	58	6	43	270[b]
BGHIPER	175	175	6	140	780
SUMPAH	7,313	9,739	114	4,420	54,000

(C) PAH compounds measured in mussels (*n*=42)

Chemical	Mean	SD	Minimum	Median	Maximum
FLUORENE	17	9	3	18	35
PHEN	33	21	10	28	110
ANTH	14	15	4	10	71
C1	57	28	22	52	150
C2	86	48	20	83	280
C3	73	35	17	68	190
C4	41	16	6	41	92
FLUORAN	85	38	23	77	180
PYRENE	88	53	15	81	350
BAA	32	18	3	30	120
CHRYSENE	50	24	13	46	160
SUMBENZ	102	83	6	90	530
BEP	58	41	19	53	280
BAP	26	19	7	22	120
PERYLENE	32	17	10	29	110
INDEN123	28	11	3	30	53
DIBAHA	33	7	24	31	54
BGHIPER	38	15	5	39	71
SUMPAH	902	356	453	855	2,614

[a]Concentration above ER-L.
[b]Concentration above ER-M.
[c]Concentration above AET.

Table 3-17. Descriptive statistics for PCB congeners (ng/g) measured in surface sediment grabs, sediment cores, and indigenous mussels. For each PCB compound, the mean, standard deviation of mean, minimum, median, and maximum values are presented.

(**A**) PCB congeners measured in mussels (*n*=45)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	1.6	1.3	0.2	1.0	5.8
PCB18	4.1	2.8	0.2	3.7	16.7
PCB28	1.9	1.2	0.3	1.4	5.4
PCB52	3.5	2.0	0.9	2.7	9.8
PCB44	1.7	1.2	0.2	1.3	6.0
PCB66	7.5	5.8	0.5	5.7	27.8
PCB101	6.2	4.0	1.1	5.2	20.2
PCB118	8.1	5.0	0.0	6.5	26.2
PCB153	19.7	12.3	3.8	16.4	76.7
PCB105	7.5	9.1	0.5	5.4	49.0
PCB138	12.6	7.6	2.5	10.9	44.5
PCB187	6.0	3.8	0.6	5.1	23.7
PCB128	3.1	1.6	0.8	2.6	8.4
PCB180	4.7	4.0	0.5	3.7	19.9
PCB170	2.0	1.9	0.1	1.3	10.9
PCB195	1.1	0.7	0.5	1.0	5.2
PCB206	1.0	0.6	0.0	0.9	4.4
PCB209	0.8	0.4	0.1	0.9	2.0
SUM	94.0	48.6	29.8	79.7	240.3
TOTAL PCB	185.4	94.8	60.3	157.5	470.7

(**B**) PCB congeners measured in surface grabs (*n*=21)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	0.6	0.4	0.0	0.5	1.9
PCB18	1.0	0.8	0.1	0.8	2.8
PCB28	0.9	0.8	0.1	0.5	3.7
PCB52	0.9	0.5	0.1	0.8	1.9
PCB44	0.7	0.6	0.0	0.6	2.8
PCB66	1.9	1.3	0.1	1.6	4.1
PCB101	1.0	0.7	0.0	1.0	2.8
PCB118	1.1	0.8	0.1	1.0	2.9
PCB153	2.5	1.8	0.1	2.5	7.3
PCB105	1.6	1.1	0.3	1.2	5.2
PCB138	2.0	1.4	0.1	2.1	5.5
PCB187	1.4	1.1	0.2	1.3	5.5
PCB128	0.8	0.7	0.0	0.6	2.9
PCB180	1.3	1.5	0.0	0.9	5.5
PCB170	1.1	1.0	0.1	0.7	4.3
PCB195	0.5	0.3	0.0	0.5	1.7
PCB206	1.1	0.8	0.0	0.9	2.9
PCB209	0.6	0.4	0.0	0.5	1.6
SUM	21.8	13.3	3.9	22.3	56.0
TOTAL PCB	42.3	26.8	6.4	43.3	111.0[a]

(Contd)

Table 3-17. Continued.

(C) PCB congeners measured in sediment cores (n=41)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	2.6	6.8	0.02	0.5	42.6
PCB18	1.1	0.9	0.02	0.8	3.7
PCB28	2.4	3.3	0.06	1.3	18.3
PCB52	1.3	1.3	0.02	0.8	7.0
PCB44	1.3	1.7	0.02	0.5	7.1
PCB66	2.7	3.6	0.02	0.5	12.9
PCB101	1.9	2.1	0.05	1.0	10.5
PCB118	2.4	5.3	0.34	1.0	34.0
PCB153	4.4	4.1	0.15	3.1	17.7
PCB105	1.9	3.0	0.18	0.9	19.4
PCB138	4.3	4.4	0.03	3.0	19.4
PCB187	1.5	1.8	0.10	0.9	8.5
PCB128	2.4	6.4	0.05	0.8	40.8
PCB180	2.2	2.7	0.24	0.7	11.1
PCB170	2.7	3.0	0.06	1.6	12.5
PCB195	1.6	2.3	0.50	0.4	11.1
PCB206	16.5	19.1	0.13	10.8	91.5
PCB209	3.0	4.9	0.50	0.9	21.8
SUM	56.9	51.2	8.91	44.0	195.5
TOTAL PCB	112.9[a]	102.9	16.37	87.0[a]	391.4

[a]Concentration above ER-L.

Table 3-18. Descriptive statistics for pesticide compounds (ng/g) measured in surface sediment grabs, sediment cores, and indigenous mussels.

(A) Pesticide compounds measured in sediment grabs (*n*=21)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	2.0	4.2	0.35	0.8	19.7
ACHLOR	0.7[a]	0.3	0.09	0.6	1.5
TNONACHL	0.4	0.2	0.09	0.4	1.0
HEPTACHLOR	0.3	0.3	0.02	0.3	1.0
HEPEPX	0.3	0.3	0.01	0.1	1.0
HCB	0.8	1.5	0.02	0.2	7.2
LINDANE	0.5	0.3	0.03	0.6	1.0
MIREX	0.7	0.2	0.60	0.6	1.7
DDDOP	0.9	0.8	0.13	0.7	3.5[a]
DDDPP	3.6[a]	4.7	0.54	2.5[a]	17.7[a]
DDEOP	0.5	0.4	0.05	0.6	1.9
DDEPP	1.9	1.6	0.22	1.6	5.9[a]
DDTOP	1.1[a]	0.9	0.23	0.6[a]	3.7[a]
DDTPP	13.0[b]	21.6	0.60	6.9	90.4[b]
SUMPEST	27.3	28.6	5.82	16.1	123.8

(B) Pesticide compounds measured in sediment cores (*n*=41)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	7.8	15.4	0.13	0.6	77.6
ACHLOR	1.5[a]	1.9	0.01	0.6	8.4[b]
TNONACHL	0.6	0.6	0.01	0.6	3.3
HEPTACHLOR	0.4	0.3	0.00	0.4	1.6
HEPEPX	0.4	0.2	0.02	0.5	1.3
HCB	1.0	1.4	0.05	0.5	8.2
LINDANE	3.4	16.8	0.06	0.6	108.5
MIREX	0.6	0.0	0.60	0.6	0.6
DDDOP	2.3[a]	3.4	0.02	1.0	19.1[a]
DDDPP	6.1[a]	10.8	0.60	1.6	62.7[b]
DDEOP	1.0	0.9	0.30	0.6	4.3[a]
DDEPP	2.8[a]	2.8	0.02	2.0	16.2[b]
DDTOP	1.4[a]	3.3	0.00	0.6	21.2[b]
DDTPP	32.8[b]	42.5	0.60	9.1[b]	144.5[b]
SUMPEST	62.8	62.8	5.25	29.0	234.5

(Contd)

[a]Concentration above ER-L.
[b]Concentration above ER-M.

Table 3-18. Continued.

(C) Pesticide compounds measured in mussels (n=45)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	1.7	0.8	0.49	1.5	4.4
ACHLOR	3.3	2.2	0.96	2.5	8.2
TNONACHL	3.2	1.6	1.17	2.6	8.6
HEPTACHLOR	0.9	0.8	0.06	1.1	5.1
HEPEPX	0.5	0.5	0.07	0.3	2.3
HCB	1.3	1.5	0.28	0.9	8.6
LINDANE	1.4	4.6	0.11	0.6	31.0
MIREX	1.1	0.4	0.04	1.1	2.1
DDDOP	2.1	1.7	0.16	1.3	9.1
DDDPP	10.4	8.1	2.00	8.5	46.9
DDEOP	1.1	0.3	0.16	1.1	2.7
DDEPP	11.4	7.3	4.12	9.8	44.9
DDTOP	2.3	4.0	0.07	1.2	26.7
DDTPP	9.1	10.2	0.60	6.3	54.5
SUMPEST	50.5	27.3	20.65	43.5	164.2

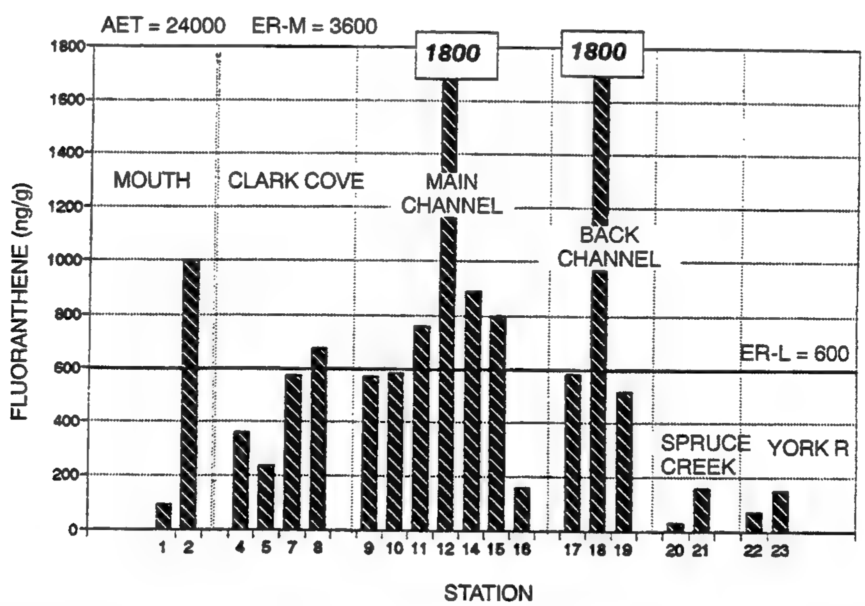

Figure 3-80. Sediment concentrations of fluoranthene measured in sediment grab samples from the lower Piscataqua River. For figures 3-80–3-90, the ER-L, ER-M, and AET toxicity threshold levels for organics are shown as appropriate.

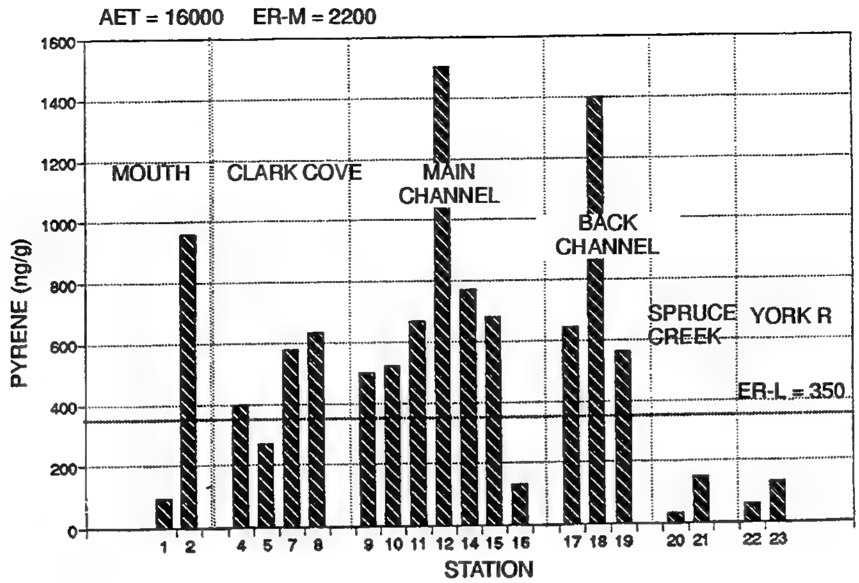

Figure 3-81. Sediment concentrations of pyrene measured in sediment grab samples from the lower Piscataqua River.

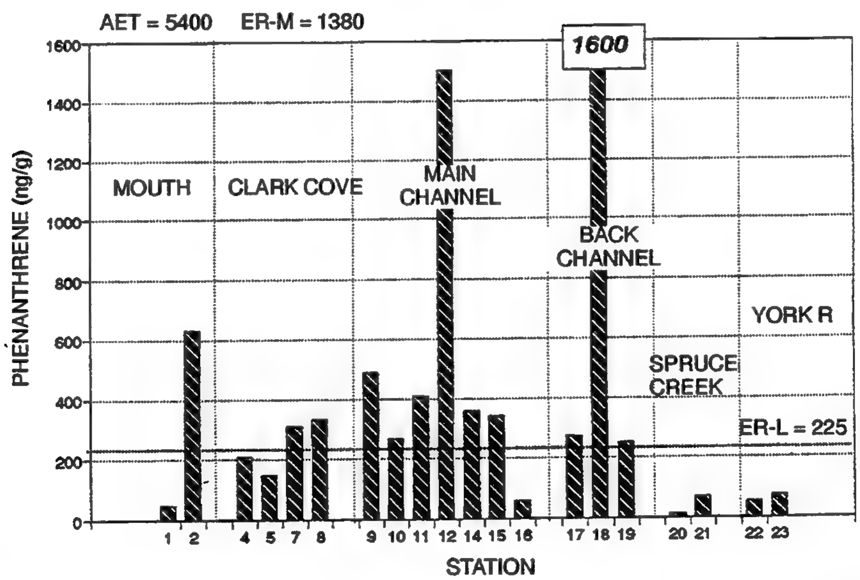

Figure 3-82. Sediment concentrations of phenanthrene measured in sediment grab samples from the lower Piscataqua River.

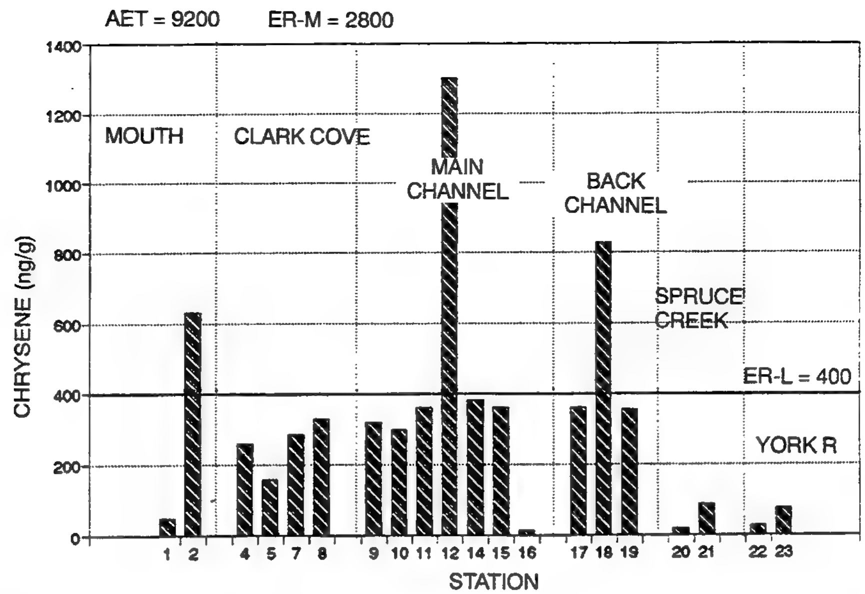

Figure 3-83. Sediment concentrations of chrysene measured in sediment grab samples from the lower Piscataqua River.

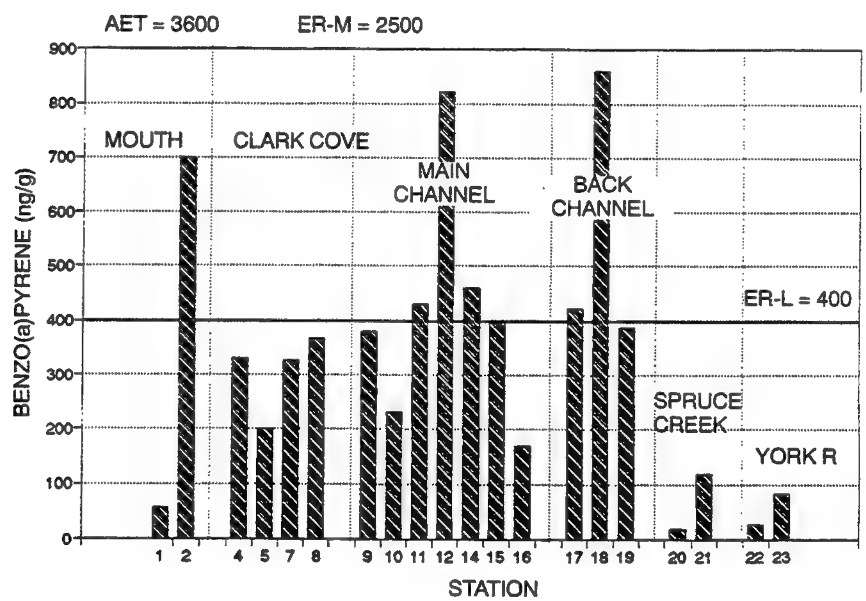

Figure 3-84. Sediment concentrations of benzo(a)pyrene measured in sediment samples from the lower Piscataqua River.

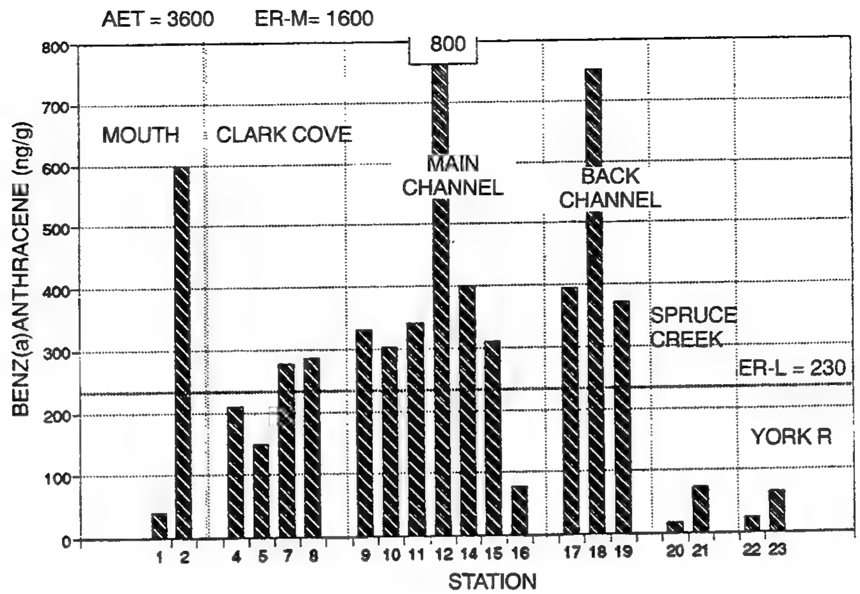

Figure 3-85. Sediment concentrations of benz(a)anthracene measured in sediment grab samples from the lower Piscataqua River.

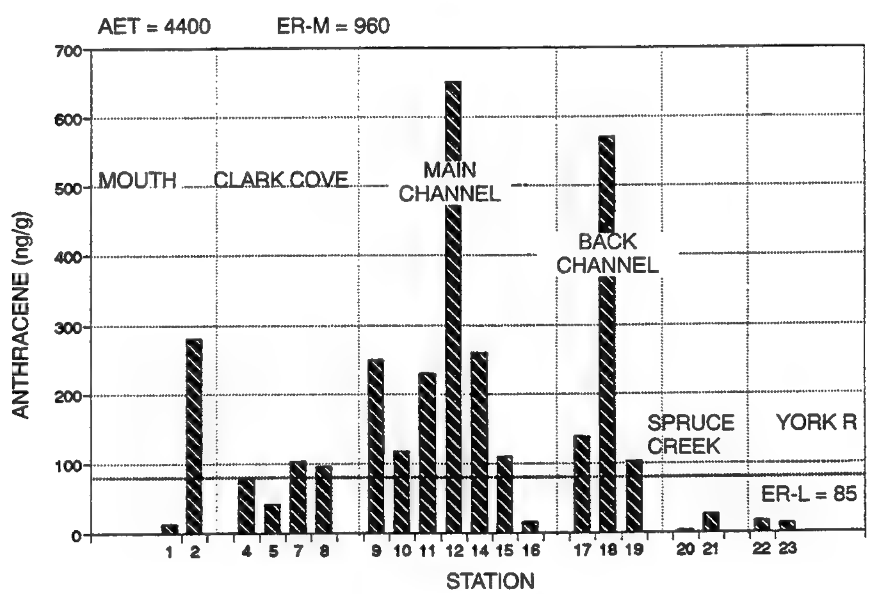

Figure 3-86. Sediment concentrations of anthracene measured in sediment grab samples from the lower Piscataqua River.

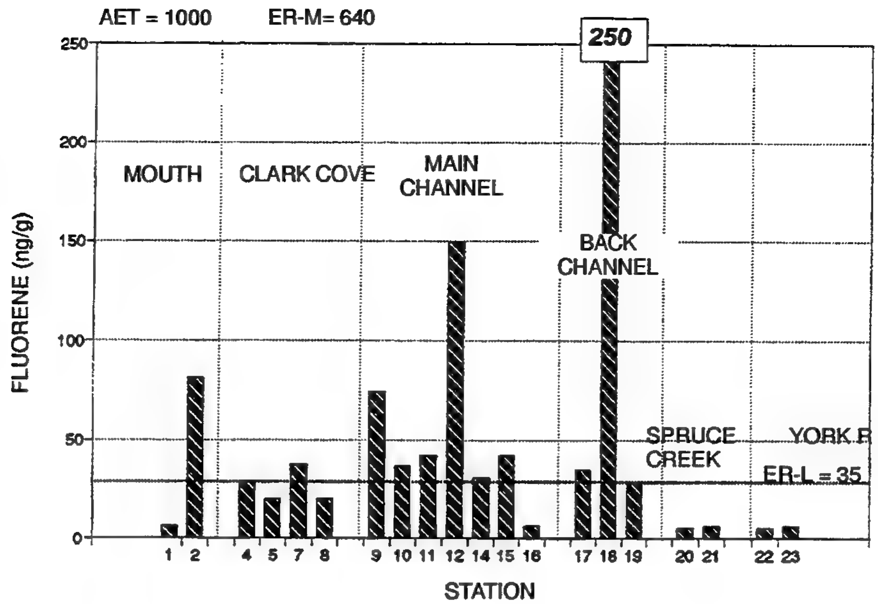

Figure 3-87. Sediment concentrations of fluorene measured in sediment grab samples from the lower Piscataqua River.

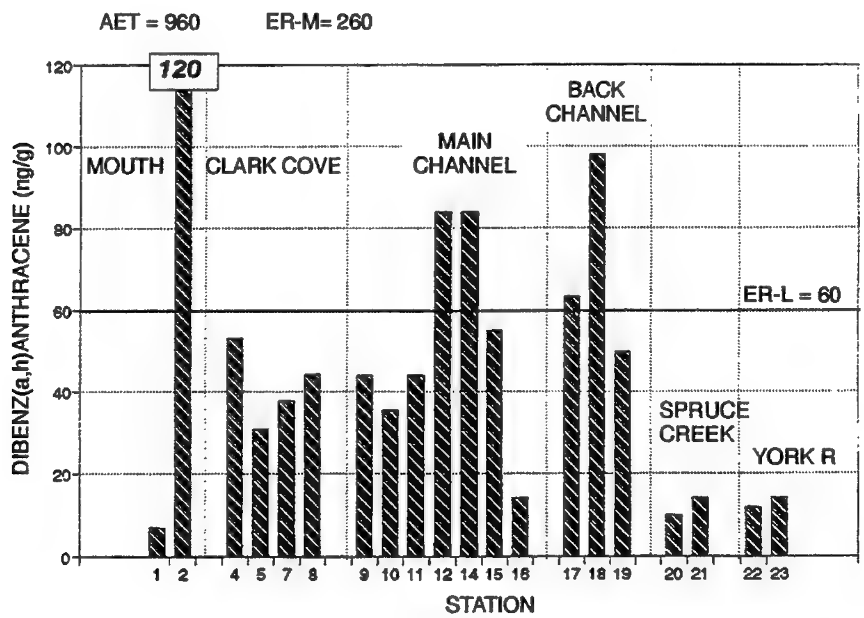

Figure 3-88. Sediment concentrations of dibenz(a,h)anthracene measured in sediment grab samples from the lower Piscataqua River.

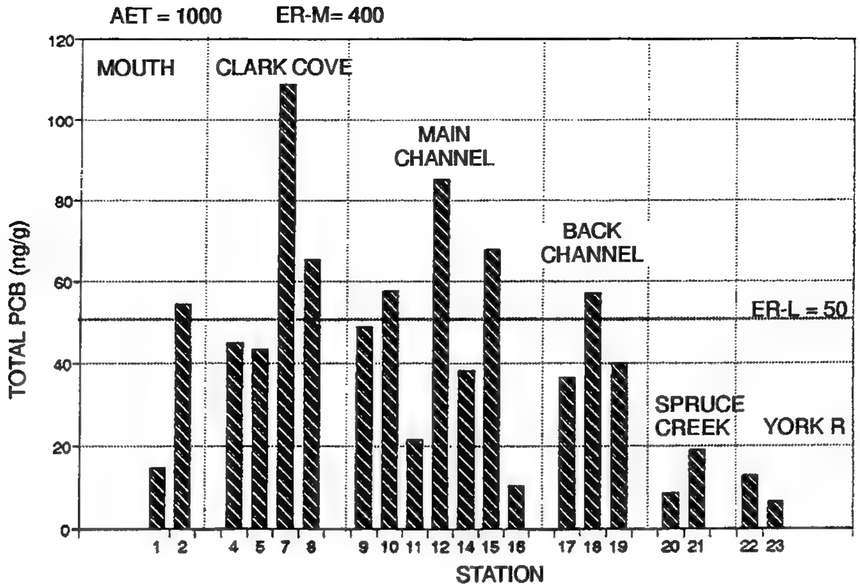

Figure 3-89. Sediment concentrations of total PCB calculated from the 18 PCB congeners measured in sediment grab samples from the lower Piscataqua River.

Most of the pesticides measured in surface sediment grabs were at concentrations at or below the LOQ except for DDTPP (Appendix L.4(m)). The pesticide DDTPP ranged from 0.6 to 91 ppb and averaged 13 ppb (table 3-18). Concentrations above the LOQ were also measured for Aldrin (average 2.1 ppb) and DDDPP (average 3.7 ppb). The ER-L (1 ppb) and ER-M (7 ppb) toxicity thresholds were exceeded at almost all stations, and the AET (34 ppb) toxicity threshold was exceeded at Stations 9 and 12 (figure 3-90).

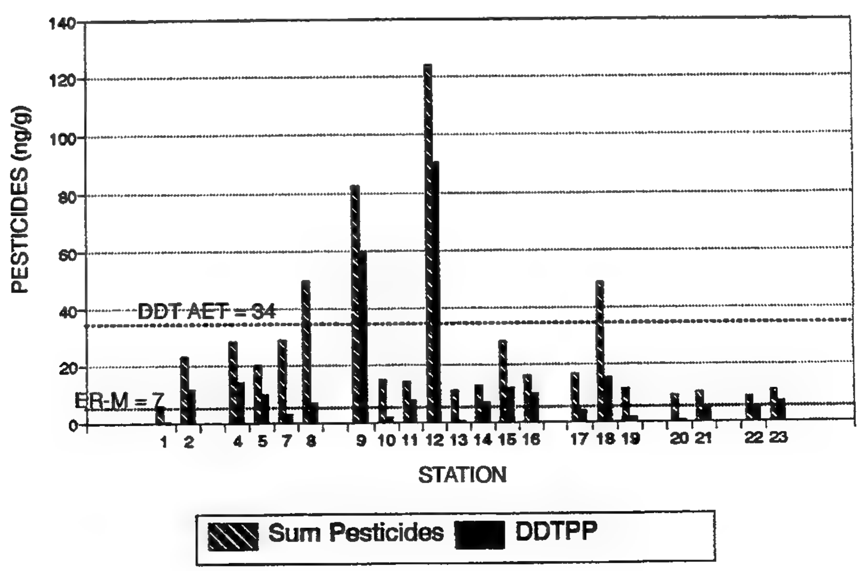

Figure 3-90. Sediment concentrations of 14 pesticides (Sum Pesticides) and p,p′-DDT (DDTPP) measured in sediment grab samples from the lower Piscataqua River.

Core Profiles

Heavy metal concentrations measured in core profiles are shown in figures 3-91–3-99 and summarized in table 3-15b. In general, average concentrations of Cr, Cu, and Pb where higher in the core samples than in the grab samples (table 3-15b). Core profiles revealed a general decrease in concentration levels with depth for most cores, except for the cores sampled from Stations 10 and 12. The core from Station 10 had elevated concentrations of A1, Zn, Pb, and Cu measured at depths greater than 50 cm. The Station 12 core had elevated concentrations of As, Cd, Cr, Cu, Pb, Ni, and Zn at depths greater than 20 cm (figures 3-91–3-99).

On average, PAH and pesticide compounds were higher in the sediment core samples than in the surface sediment grabs (tables 3-16–3-18). Seven of the PAH compounds measured in core samples exceeded ER-L levels, but none were above ER-M levels (table 3-16b). Maximum concentrations of eight of the PAHs were above ER-M levels, and the AET threshold was exceeded by PHEN and BAA (table 3-16b). Core concentrations of TOTALPCB were lower than TOTALPCB concentrations measured in surface grabs (table 3-17b). The only pesticide measured at levels consistently above the LOQ was DDTPP (Appendix L.4(l)). The average concentration of DDTPP measured in the core samples was about 2.5 times higher than DDTPP measured in surface sediment samples (table 3-18). The highest concentrations were measured in the core samples from Stations 7 and 19 (Appendix L.4(l)).

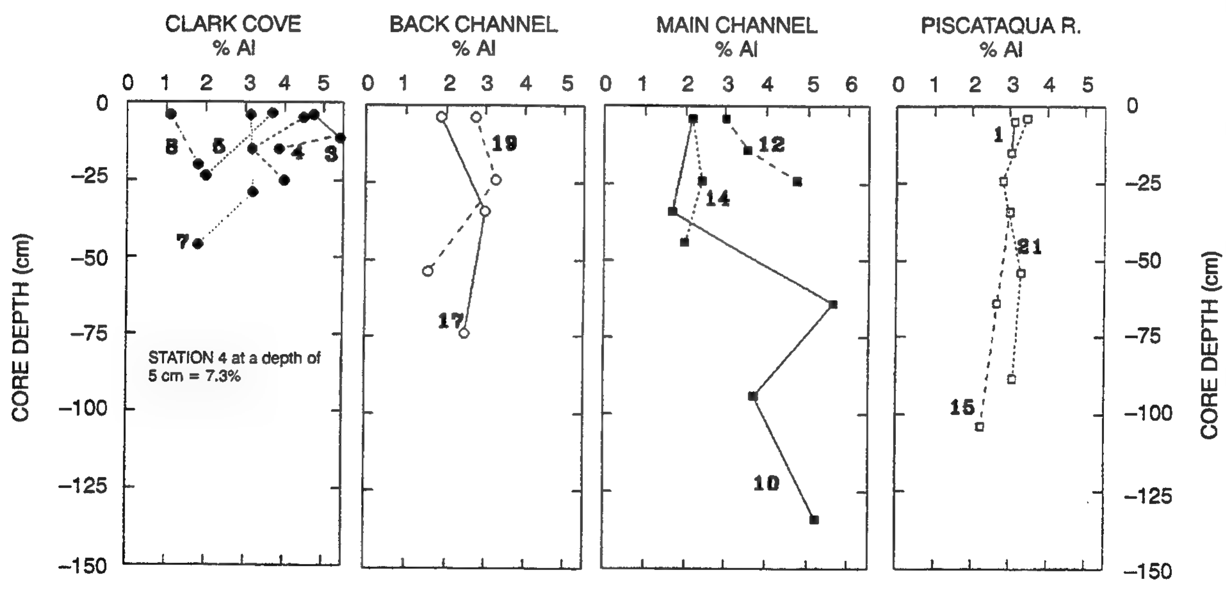

Figure 3-91. The percent of Al (g/g) measured in sediment cores from the lower Piscataqua River.

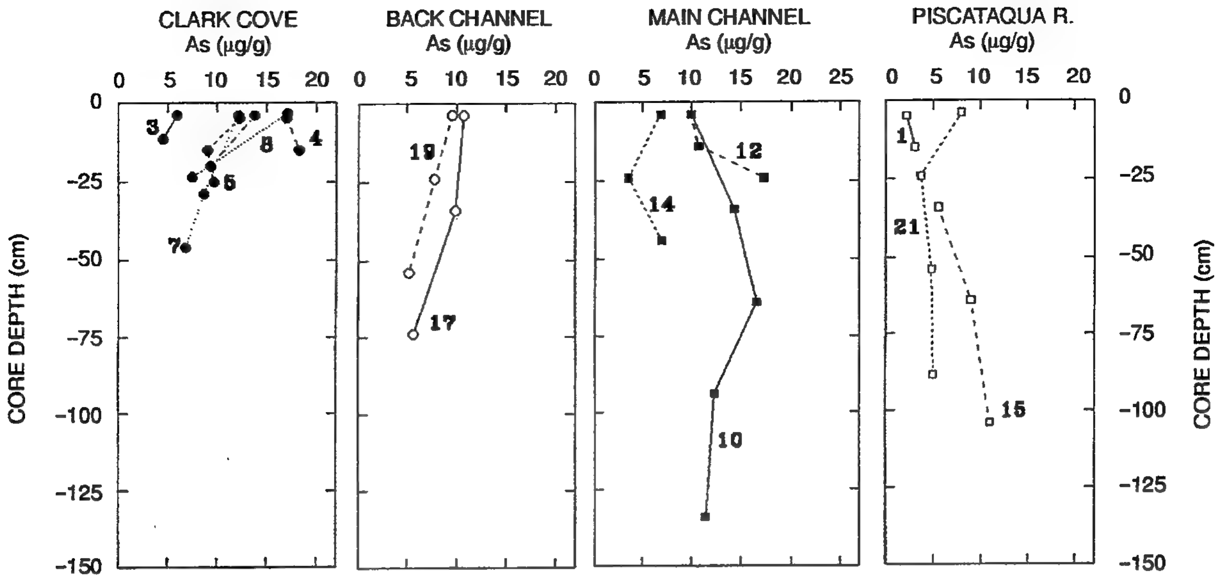

Figure 3-92. The concentration of As measured in sediment cores from the lower Piscataqua River.

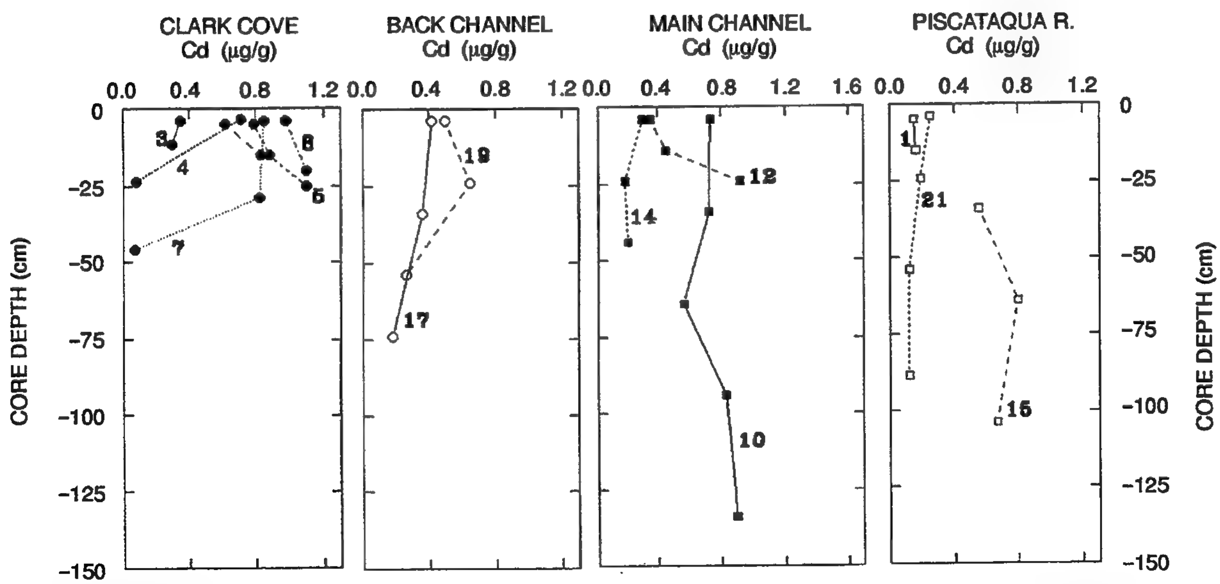

Figure 3-93. The concentration of Cd measured in sediment cores from the lower Piscataqua River.

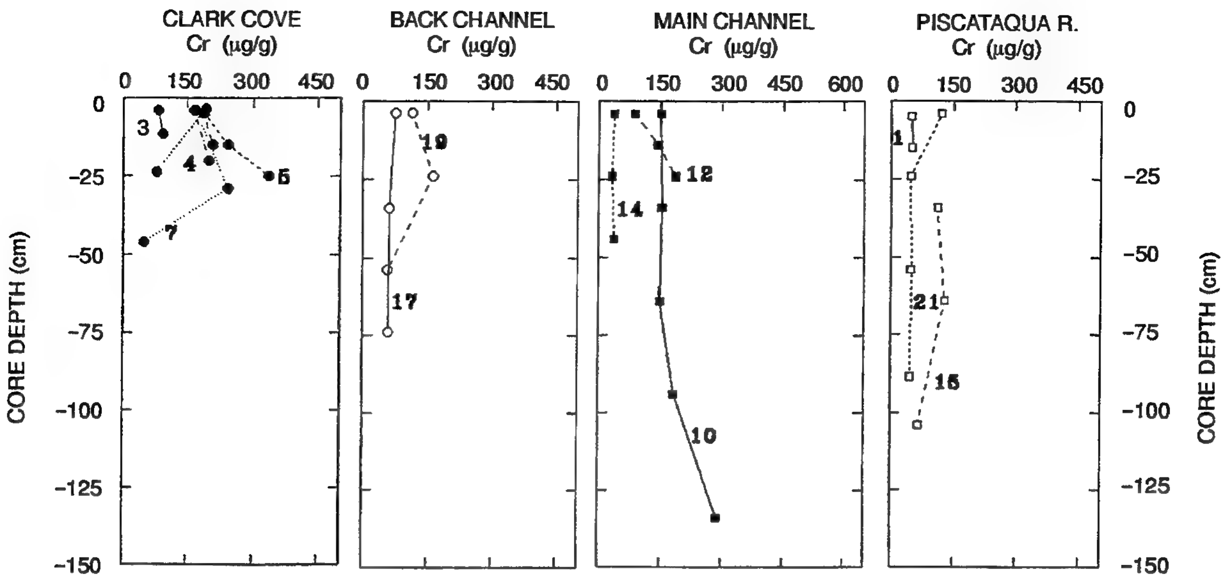

Figure 3-94. The concentration of Cr measured in sediment cores from the lower Piscataqua River.

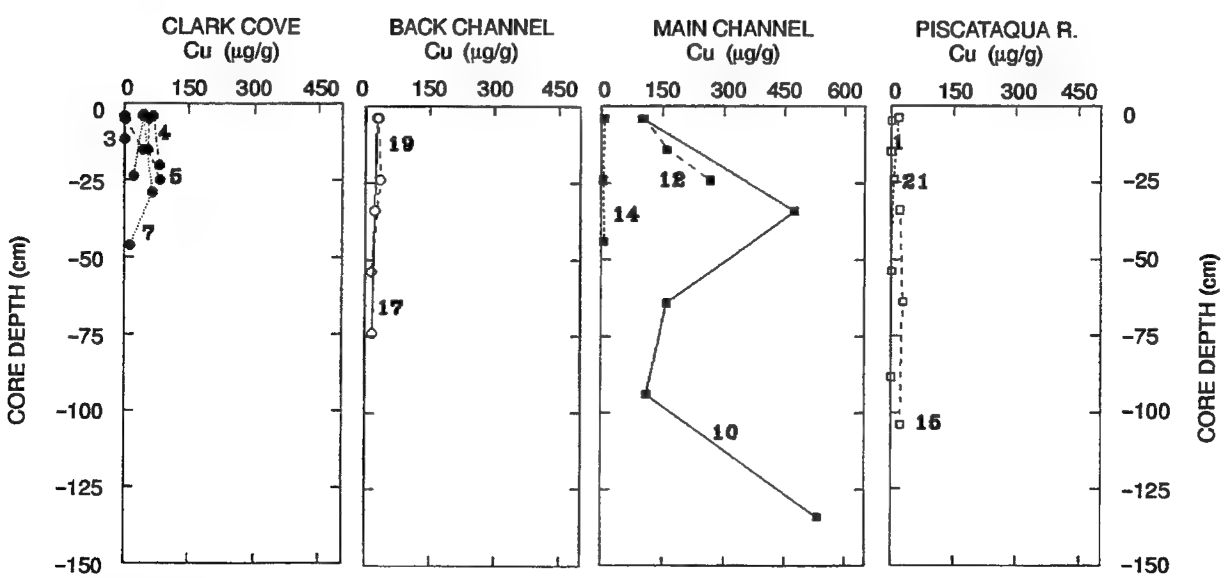

Figure 3-95. The concentration of Cu measured in sediment cores from the lower Piscataqua River.

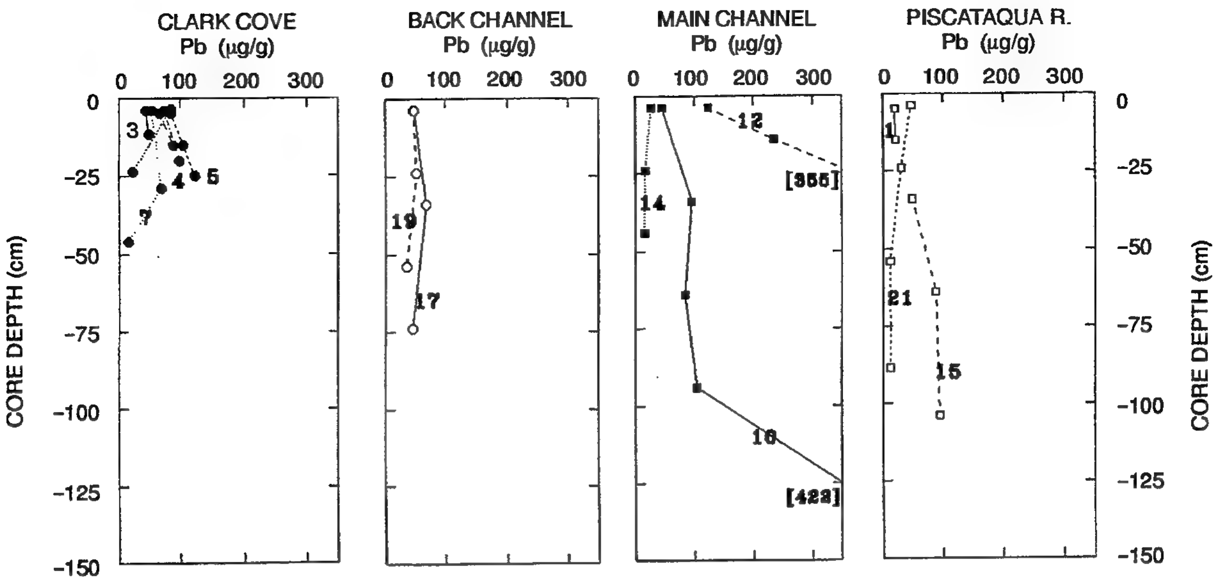

Figure 3-96. The concentration of Pb measured in sediment cores from the lower Piscataqua River. Note high Pb levels at depth in cores from the Main Channel Stations 10 and 12.

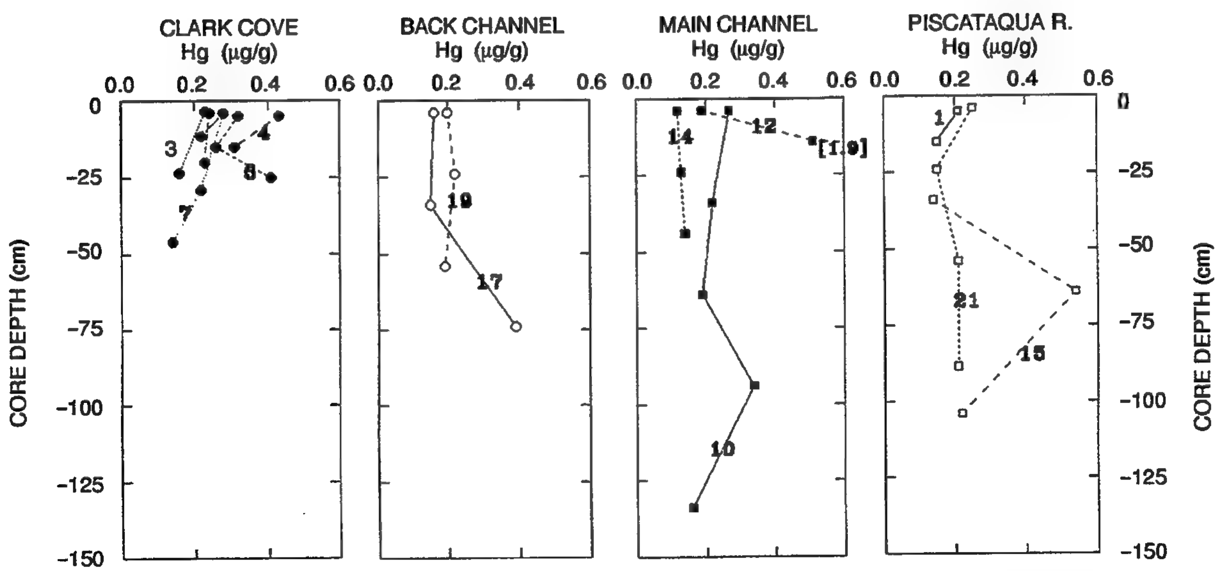

Figure 3-97. The concentration of Hg measured in sediment cores from the lower Piscataqua River. Note high concentration (1.9 µg/g) measured in the core from Main Channel Station 12.

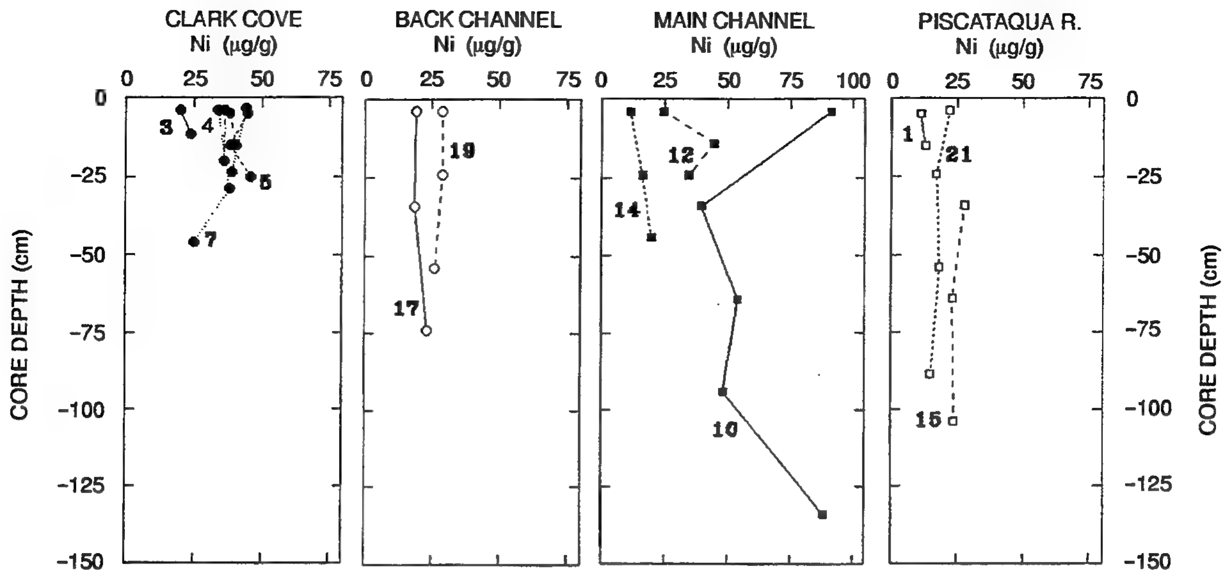

Figure 3-98. The concentration of Ni measured in sediment cores from the lower Piscataqua River.

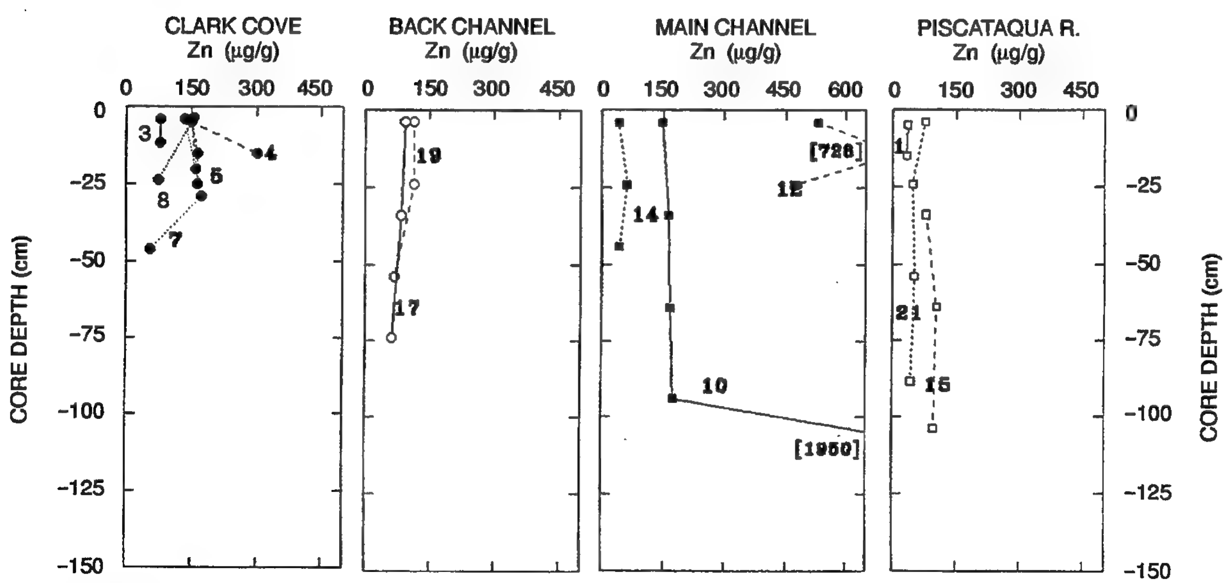

Figure 3-99. The concentration of Zn measured in sediment cores from the lower Piscataqua River. Note high Zn levels measured in the Main Channel cores from Stations 10 and 12.

WATER RESULTS

Problems were encountered in obtaining target detection levels in seawater samples. The methodology used was not able to achieve the target method detection limits required to meet the data quality objectives of the estuarine study (table 3-10). More precise analytical methods capable of measuring much lower concentrations of toxic metals in saltwater were used during Phase II of the estuarine investigation (NCCOSC et al., 1994). However, the water analysis methods were able to measure heavy metals in the seep samples. High concentrations of Pb, Hg, Zn, Cr, and Cu were measured in two of the seep samples collected from the back side of Jamaica Island (near Station 19). These samples may have been contaminated during collection by entraining sediment particles into the water sample (S. Urschel, McLaren/Hart, Environmental Engineering Corp., Personal Communication).

BIOTA RESULTS

Mussel, eelgrass, and algae were collected from station locations in the lower Piscataqua estuary and York River Harbor (identified in figure 2-17). Mussels, eelgrass, and oysters were also collected from station locations in the upper Great Bay Estuary (see figure 2-8). Winter flounder and lobster samples were obtained from otter trawls in the Portsmouth Harbor and York River Harbor (see figure 3-54, p. 3-76).

Deployed Mussels

The results obtained from the ANOVA of contaminant concentrations in the deployed mussels are given in table 3-19. Statistically different concentrations between the predeployed (T0) and deployment mussels (at Stations 2, 8, 19, 15, and 22) were detected for Cu, SUMPAH, TBT, MBT, and TOTALPCB. The highest mean for Cu was obtained from Station 8; however, the statistically similar group included Station T0 (predeployed mussels). The statistically significant difference detected for Cu may be due to the lower concentration measured at Station 19. The highest PAHs and TOTALPCBs were measured at Station 15 (Cutts Cove). The highest concentrations of TBT were measured at Station 2 (Coast Guard) and Station 15 (Cutts Cove). Also of note was that average Hg concentrations increased by more than a factor of two above the predeployment concentrations, although this difference was not statistically significant at the p=0.05 level (table 3-19).[5]

Low concentrations of many of the analytes measured in predeployment mussels, which were at or below the MDL, makes the determination of significance difficult (see Appendix L). The results from the chemical analysis of deployed mussels suggested that, except for SUMPAH TOTALPCB, and TBT there was no appreciable contaminant uptake during the period of deployment (September to October 1991; see Section 3.11). This could mean that there was relatively low contaminant availability or input into the estuary during the deployment period.

[5] Hg concentrations reported were below the LOQ (see Appendix L.5).

Table 3-19. Results from the ANOVA of contaminant concentrations in deployed mussels (n = 3 samples per station). Metal concentrations are in μg/g and organic and butyltin concentrations are in ng/g.

Chemical	Effect[a]	Station Means[b]					
		T0	2	8	19	15	22
As	NS	10.4	8.2	10.6	8.5	12.5	12.0
Cd	NS	0.8	1.0	1.1	1.0	1.3	1.3
Cr	NS	2.7	2.5	2.7	1.7	2.2	1.7
Cu	0.049	6.3[AB]	7.3[A]	8.3[A]	4.8[B]	6.9[A]	6.9[A]
Pb	NS	2.3	2.6	2.9	1.9	3.5	2.5
Hg	NS	0.06	0.13	0.13	0.09	0.14	0.11
Ni	NS	1.1	1.8	1.8	1.4	1.5	1.6
Ag	NS	0.7	0.7	0.9	0.4	0.7	0.3
Zn	NS	77.6	90.4	81.8	59.4	81.0	77.4
SUMPAHs[c]	0.0004		790.7[A]	453.7[B]	425.0[B]	726.3[A]	410.3[B]
TOTALPCB	0.005	197.8[C]	187.3[C]	222.6[BC]	301.4[AB]	378.9[A]	186.1[C]
Sum Pesticides	NS	88.2	73.4	77.1	86.9	113.3	64.7
TBT	<0.0001	40.0[D]	120.0[A]	100.0[B]	90.0[C]	120.0[A]	30.0[D]
DBT	NS	30.0	60.0	20.0	60.0	40.0	20.0
MBT	<0.0001	60.0[A]	50.0[C]	50.0[B]	50.0[C]	50.0[BC]	40.0[D]

[a]Entries are the probability that the observed differences occurred by chance (NS = not significant).
[b]Mean values are given for each group. Statistically similar groups ($p<0.05$) are identified with grouping variables (A, B, C).
[c]PAH concentrations in predeployed mussels (T0) were not measured.

Indigenous Mussels

Comparison with Sediment Levels. The average concentration of heavy metals measured in the tissues of indigenous mussels (table 3-20A) was lower than the average concentration of heavy metals in surface sediments (table 3-15A), except for Hg. Median mercury levels in mussel tissue were almost two times higher than the median Hg levels measured in surface sediments (the uncertainty of this result is high because many of the Hg results were below the MDL, see Appendix L.5). On average, mussel tissue concentrations of SUMPAH were only about 16 percent of concentrations measured in the surface sediments (table 3-16). The total PCB concentrations were also lower in the mussels than in the sediments; however, congeners PCB195, PCB170, PCB28, PCB8, PCB206, and PCB209 were higher in the mussels than in the sediment (table 3-17). Most of the pesticide compounds were at or below the analytical detection limit, except for DDDPP, DDEPP, and DDTPP (Appendix L.4(h)). These DDT metabolites were measured at higher concentrations in the mussel tissue than in the surface sediments (table 3-18).

Spatial Contamination Analysis. Whether contaminant sources could be related to Shipyard activity (i.e., a locus of contamination associated with Seavey Island) was evaluated by analyzing mussel contaminant concentrations in specific geographic and hydrographic regions. These analyses were conducted to determine if there were widespread indications, or spatial areas, of pollution that could be attributed to specific areas of the estuary.

Table 3-20. Inorganic elements (μg/g) measured in mussel and oyster. Butyltins (ng/g) measured in mussels.

(A) Indigenous mussel tissue (*n*=45)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	282.7	127.9	76.0	245.0	650.0
As	7.6	3.7	3.5	7.1	27.8
Cd	2.0	1.3	0.1	1.7	9.3
Cr	3.6	1.2	1.7	3.7	8.6
Cu	7.4	4.1	4.7	6.5	32.3
Fe	606.3	238.5	209.0	573.0	1,300.0
Pb	7.5	4.3	1.4	6.7	26.0
Mn	18.3	20.8	6.0	12.0	115.0
Hg	0.3	0.2	0.1	0.4	1.0
Ni	1.8	0.6	0.8	1.7	3.1
Zn	110.5	26.9	59.5	109.0	222.0

(B) Indigenous oyster tissue (*n*=4)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	243.0	157.5	87.0	235.0	415.0
As	6.0	1.9	4.3	5.4	8.8
Cd	4.6	1.5	3.5	4.0	6.8
Cr	2.9	0.6	2.2	2.9	3.8
Cu	238.3	51.1	187.0	232.5	301.0
Fe	464.8	212.0	234.0	463.5	698.0
Pb	0.97	0.3	0.6	0.98	1.3
Mn	17.0	5.9	9.0	18.5	22.0
Hg	0.16	0.05	0.07	0.18	0.2
Ni	3.13	0.7	2.7	2.9	4.1
Zn	5,657.5	1,083.3	4,620.0	5,455.0	7,100.0

(C) Indigenous mussel tissue residues of total butyltins (*n*=11)

Chemical	Mean	SD	Minimum	Median	Maximum
SUMBT	260.1	208.1	96.0	233.0	853.5
MBT	57.1	17.7	37.5	56.0	82.5
DBT	125.8	170.9	34.5	66.0	624.0
TBT	77.2	54.8	2.0	87.5	156.5

The results of the ANOVA of mussel tissue concentrations for specific geographic and hydrographic groupings are summarized in table 3-21A. Significant differences in tissue concentrations were detected for Cr, Pb, Ni, Ag, SUMPAH, and TOTALPCB. The highest concentrations of Cr, Ni, Ag, SUMPAH, and TOTALPCB were measured in mussels collected from the upper Piscataqua River and Little Bay (GB), possibly suggesting an up-estuary source for those contaminants. The highest concentrations of Pb were measured in mussels collected in the Main Channel (MC) near Seavey Island, which suggests a source within the lower portion of the estuary.

Statistically significant differences in mussel tissue concentrations for Cr and Pb were also detected when the indigenous mussel data were separated into two groups: those stations near the shoreline of Seavey Island (Seavey), and those stations not near the shoreline of Seavey Island (non-Seavey) (table 3-21B). Chromium was significantly higher (4.4 µg/g) in the non-Seavey group, while Pb was significantly higher (11.1) in the Seavey group.

Differences in Hg concentrations were not statistically significant for either of the grouping schemes (table 3-11). The result of nonsignificance for Hg suggests that areas of high Hg residues in mussels (Station 10, 0.97 µg/g; Station 19, 0.96 µg/g; and Station 14, 0.72 µg/g; see Appendix L.5(h)) did not follow a specific pattern that could be resolved by the approach reported here.

Background Mussel Residues

Concentrations calculated from measurements of the predeployed mussels were used as measures of background contaminant levels for the New England coast. The predeployment mussels were collected from an area (Sandwich, MA) that is removed from any known sources of contamination. Mussels from this area have been determined, from previous studies, to be clean of the pollutants of concern for this study (Nelson et al., 1987; see Section 3.11). The predeployed mussels were also collected at about the same time as the indigenous mussels for this study (Nelson et al., 1987; see Section 3.11) to control for seasonal variations in mussel physiology and feeding parameters. The background concentrations obtained from the predeployed mussels (Appendix L) were used to calculate the BU ratios for the indigenous mussels, so that relative contaminant concentrations could be displayed on the same scale. The BU were calculated for chemicals that showed statistically significant concentrations of tissue residues (Pb, Cr, Zn, Ni, and TPCB), and for representative PAH[6] compounds (PYRENE, FLUORAN, PHEN, and BAP) to provide a measure of the relative pollution levels measured in the estuary (table 3-22).

The BU calculated for Pb, Cr, Zn, and Ni are shown for Clark Cove, Seavey Island, and reference stations in figures 3-100, 3-101, and 3-102, respectively. Lead ranged from 2 to 5 times background for stations located in Clark Cove (figure 3-100) and the Back Channel (figure 3-101), and exceeded 11 times the background Pb concentration at the station located adjacent to the storage yard (Station 10A, figure 3-101). Concentrations of Cr and Ni were about 2–3 times background in samples from the upper part of the estuary (figure 3-102). Mercury concentrations were not included in these graphs because the background concentrations, measured in the predeployed mussel tissue, and concentrations in most of the indigenous mussels were below the MDL, making calculations of BU ratios uncertain (Appendix L.5). However, Hg concentrations that were above the MDL at concentrations many times above background (0.06 µg/g) were measured in the Back Channel at Station 19 (16 to 9 BU), near Dry Dock 2 at Station 10 (16 BU) and Station 12A (10 BU), in Clark Cove at Station 3 (8 BU), and at Fishing Island at Station 1 (9 BU) (table 3-22, Appendix L.5(h)).

6The background concentrations for the PAH compounds were determined from the PAH data obtained for indigenous mussels from York Harbor, ME.

Table 3-21. Results from the ANOVA for indigenous mussel contaminant concentrations. Mussels were grouped according to geographic and hydrographic groups and proximity to Seavey Island. Metal concentrations are in µg/g and organic concentrations are in ng/g.

(**A**) Geographic and hydrographic groups

Chemical	Effect[a]	Group Means[bc]					
		CC n=6	BC n=3	MC n=5	PR n=6	YR n=2	GB n=5
As	NS	11.2	8.2	7.5	7.3	3.7	9.7
Cd	NS	1.8	2.0	2.2	2.9	1.4	2.5
Cr	0.004	3.7[BC]	3.4[BC]	3.3[BC]	4.2[B]	2.1[C]	5.6[A]
Cu	NS	6.8	6.1	9.6	6.7	6.3	8.8
Pb	0.013	9.8[AB]	8.3[ABC]	13.3[A]	8.2[BC]	2.2[C]	4.8[C]
Hg	NS	0.3	0.4	0.5	0.3	0.3	0.4
Ni	0.04	2.1[AB]	2.0[ABC]	1.7[BC]	1.7[BC]	1.2[C]	2.5[A]
Ag	0.05	0.9[AB]	0.9[AB]	0.1[B]	0.5[B]	0.1[B]	1.9[A]
Zn	NS	117.5	103.5	134.0	124.0	83.9	132.3
SUMPAHs	0.0013	807.5[BC]	866.4[BC]	806.4[BC]	956.1[B]	542.5[C]	1,443.0[A]
TOTALPCB	0.006	211.0[B]	163.1[BC]	178.3[BC]	164.4[BC]	90.3[C]	312.9[A]
Sum Pesticides	NS	60.9	43.3	50.3	43.6	36.4	67.5

(**B**) Proximity to Seavey Island (Seavey = stations located along shoreline of Seavey Island; Non-Seavey = stations not located along shoreline of Seavey Island). Metal concentrations are in µg/g and organic and organotin concentrations are in ng/g.

Chemical	Effect[a]	Group Means[bc]	
		Seavey n=13	Non-Seavey n=14
As	NS	7.7	7.6
Cd	NS	2.0	2.4
Cr	0.081	3.5	4.4
Cu	NS	7.7	7.2
Pb	0.023	11.1	6.0
Hg	NS	0.38	0.29
Ni	NS	2.0	1.9
Ag	NS	0.64	0.91
Zn	NS	122.8	118.7
SUMPAHs	NS	837.7	980.2
TOTALPCB	NS	185.9	185.1
Sum Pesticides	NS	52.8	47.3
SUMBT	NS	176.4[d]	330.6[e]

[a]Entries are the probability that the observed differences occurred by chance (NS = not significant).
[b]Mean values are given for each group. Statistically similar groups are identified with grouping variables (A,B,C).
[c]Unbalanced ANOVA was used to account for unequal sample size. Significance level was determined by F-test with $p<0.05$ (Statistix, 1992).
[d]n=5.
[e]n=6.

Table 3-22. Indigenous mussel tissue residues in background units.

Station	Pb	Hg	Zn	Ni	Cr	TPCB	PYRENE	FLUORAN	PHEN	BAP
1	3.3	0.0	1.5	1.4	1.4	0.8	1.6	1.1	0.3	0.6
2	4.3	8.2	1.8	1.3	1.1	0.8	4.5	3.7	1.9	1.4
3	2.4	8.2	1.4	1.9	1.1	1.2	1.9	1.0	0.6	0.8
4	4.5	3.7	1.7	1.3	1.5	0.8	2.3	1.6	0.5	1.1
5	4.7	7.3	1.4	1.8	1.6	0.9	1.9	1.3	0.6	0.8
6	3.9	2.7	1.7	1.7	1.4	1.3	2.7	2.2	0.8	1.0
7	4.7	4.0	1.4	2.3	1.3	1.3	3.1	2.4	0.7	0.9
8	5.3	3.0	1.5	3.0	1.5	2.0	4.5	3.9	1.0	1.4
9	4.4	5.7	1.7	1.5	1.4	0.7				
10	5.9	16.2	2.9	1.3	1.3	0.6	2.1	1.3	1.2	0.9
10A	11.3	2.2	1.6	1.4	0.9	1.3	2.0	1.6	0.5	0.7
11	4.0	4.5	1.5	1.5	1.5	0.9	2.3	1.7	0.6	1.1
12	4.8	7.5	1.4	2.2	1.3	2.5				
12A	4.0	4.3	1.5	1.9	1.4	0.9				
14	2.5	12.0	1.1	1.6	1.4	0.6	1.6	1.2	0.3	1.1
16	4.0	1.2	1.5	1.6	1.4	0.9	2.5	1.3	0.4	1.3
17	2.7	2.5	1.3	1.6	1.2	1.1	2.8	2.0	0.8	1.2
18	5.0	3.2	1.3	1.3	1.1	0.8	2.6	2.2	0.5	0.8
19	3.2	16.0	1.4	2.7	1.4	1.5	2.8	2.2	1.1	1.0
20	2.9	4.3	1.7	2.0	1.6	1.1	2.0	1.3	0.6	0.9
21	2.8	0.0	1.6	2.0	2.1	1.0	2.8	1.8	0.7	1.3
22	0.8	1.8	1.2	1.0	0.7	0.5	1.1	1.0	1.2	0.8
23	1.1	7.3	1.0	1.2	0.8	0.5	0.9	1.0	0.8	1.2
24	2.5	8.3	1.7	2.6	2.3	1.7	4.2	2.8	1.1	3.8
25	1.7	5.8	1.5	1.9	1.4	1.0	2.8	1.8	0.4	1.7
26	2.6	3.3	1.6	3.0	3.2	2.3	9.9	3.9	0.5	5.6
27	2.5	7.7	1.8	2.5	1.9	1.3	2.5	1.5	0.6	2.0
28	1.2	4.8	1.8	1.8	1.6	1.6	3.4	1.6	0.4	1.8

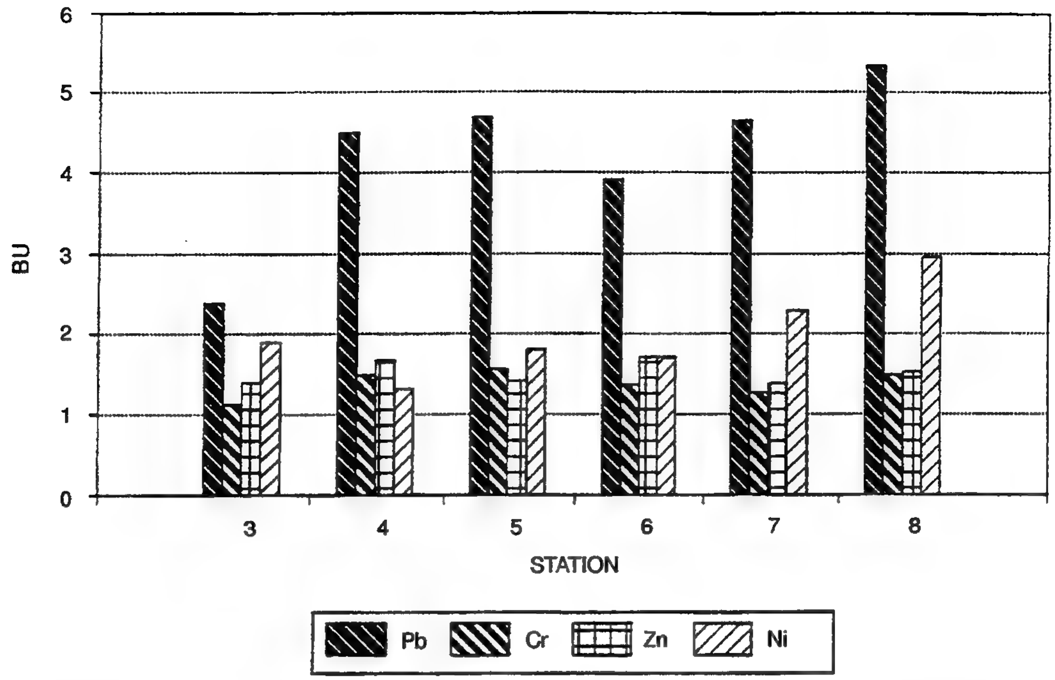

Figure 3-100. Mussel tissue concentrations of Pb, Cr, Zn, and Ni displayed in BU for the stations located in Clark Cove. The levels of Pb, Ni, and Zn were measured at significantly higher concentrations in Clark Cove.

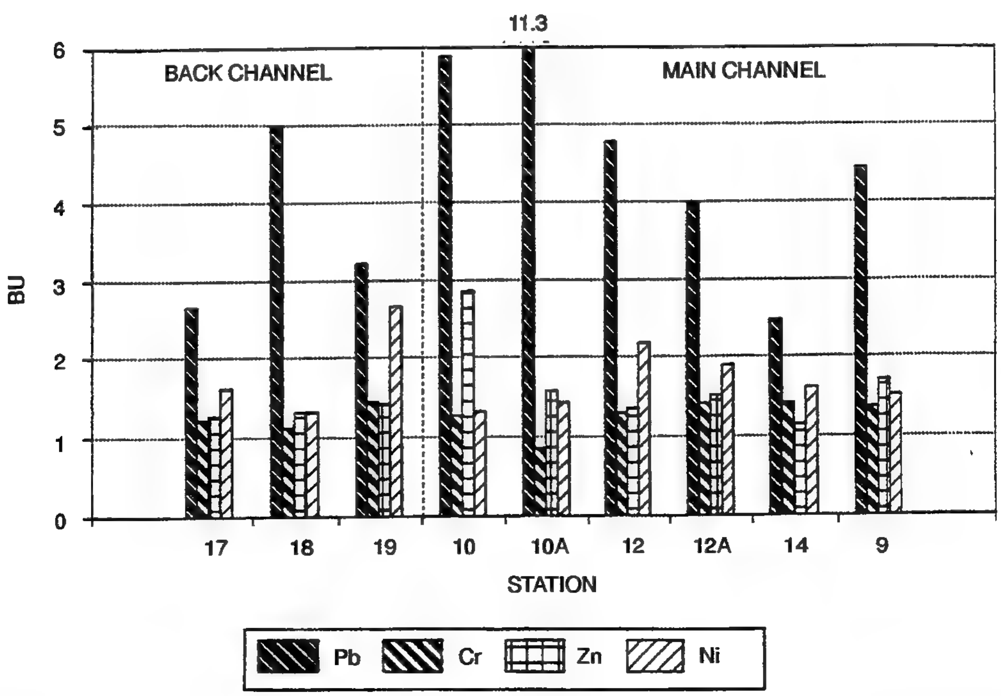

Figure 3-101. Mussel tissue concentrations of Pb, Cr, Zn, and Ni displayed in BU for the stations located in the Back Channel and Main Channel of Seavey Island.

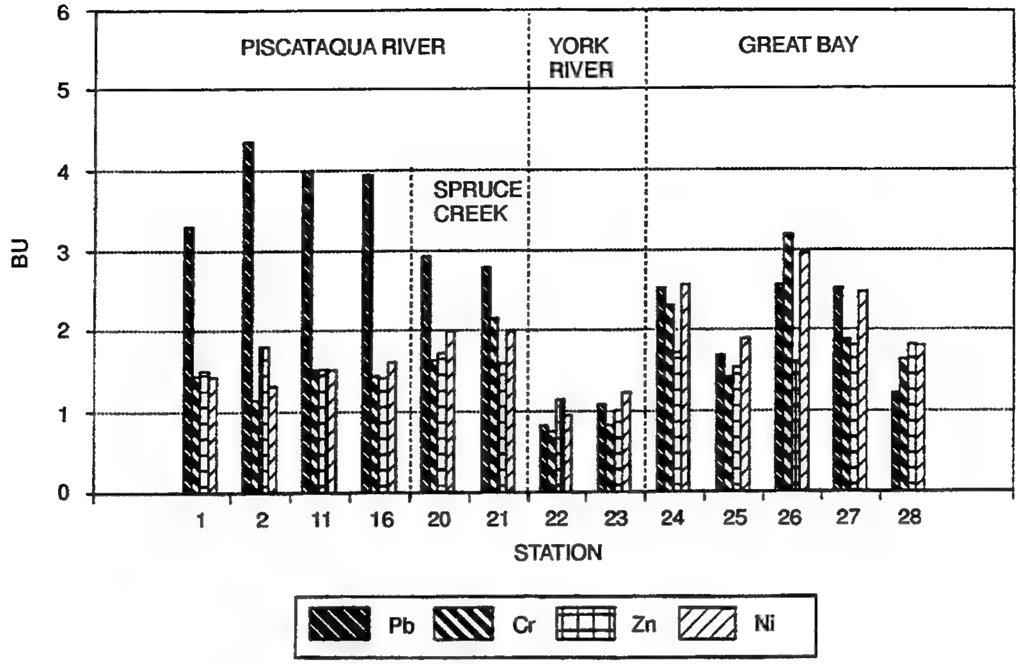

Figure 3-102. Mussel tissue concentrations of Pb, Cr, Zn, and Ni displayed in BU for the stations located in the Piscataqua River, York River, and upper Great Bay Estuary. The levels of Pb were statistically higher in the lower estuary, and the levels of Cr were statistically higher in the upper estuary.

The concentration of SUMPCB exceeded background concentrations at stations located in Clark Cove, Main Channel, Back Channel, and Great Bay, but was within a factor of 3 times background at all stations (figure 3-103). Indigenous mussel tissue concentrations of SUMPAH were all near or below background concentrations at all stations, except for one station located in the upper Piscataqua River (figure 3-104). Pesticide concentrations were also below background concentrations, except for Station 8 in Clark Cove and Station 9 in the Main Channel (figure 3-105).

Oyster Tissues

Oyster tissues sampled from the upper Great Bay Estuary showed very high concentrations of Cr, Pb, and Zn and elevated concentrations of Cd, Cu, Hg, and Ni compared to oyster concentrations reporeted in Mussel Watch data (table 3-20B; O'Connor, 1992). Station 26 had cadmium levels above 5 μg/g; Station 31 had the highest Ni, Cr, As, and Pb concentrations. Oyster concentrations of heavy metals were lower than the high values reported for oyster tissue in the Mussel Watch database for all the metals except Cr, Pb, and Zn (O'Connor, 1992). The median concentration of Pb and Zn measured in Great Bay oyster tissues was about equal to the high Pb and Zn values reported for oyster tissue by Mussel Watch (0.94 and 5200 μg/g, respectively), while the median Cr concentration measured in Great Bay oysters was more than a factor of 3 above the high oyster tissue Mussel Watch value (0.93 μg/g) (O'Connor, 1992).

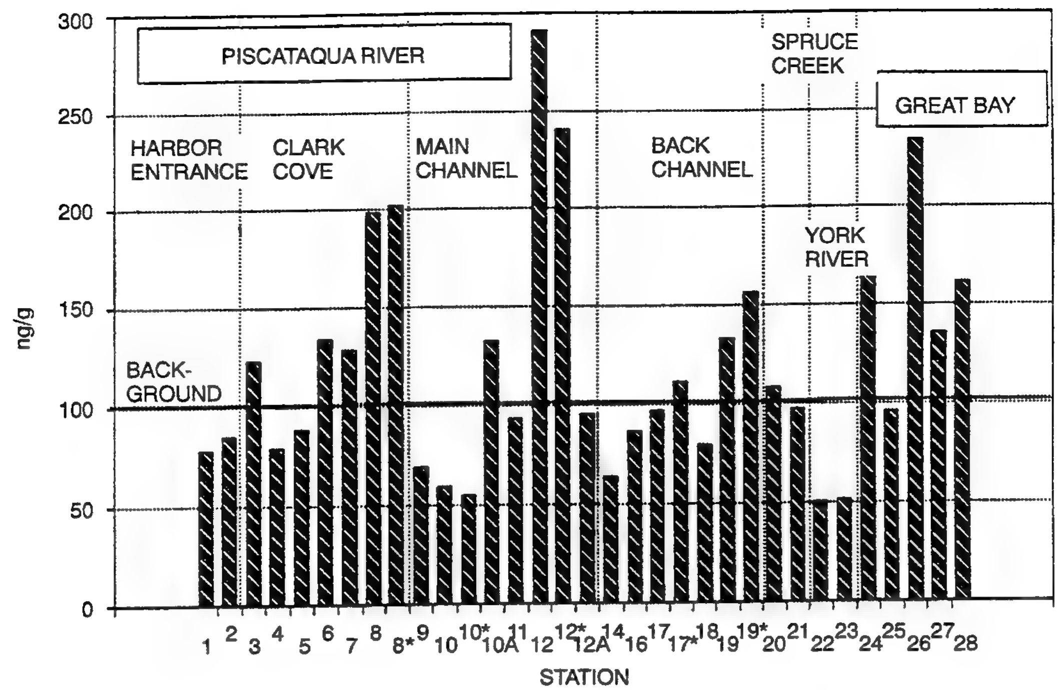

Figure 3-103. The sum of PCB congeners measured in mussels collected from the Great Bay Estuary and York River. The background PCB congener sum measured in predeployed mussels is also shown. (* indicates duplicate sample.)

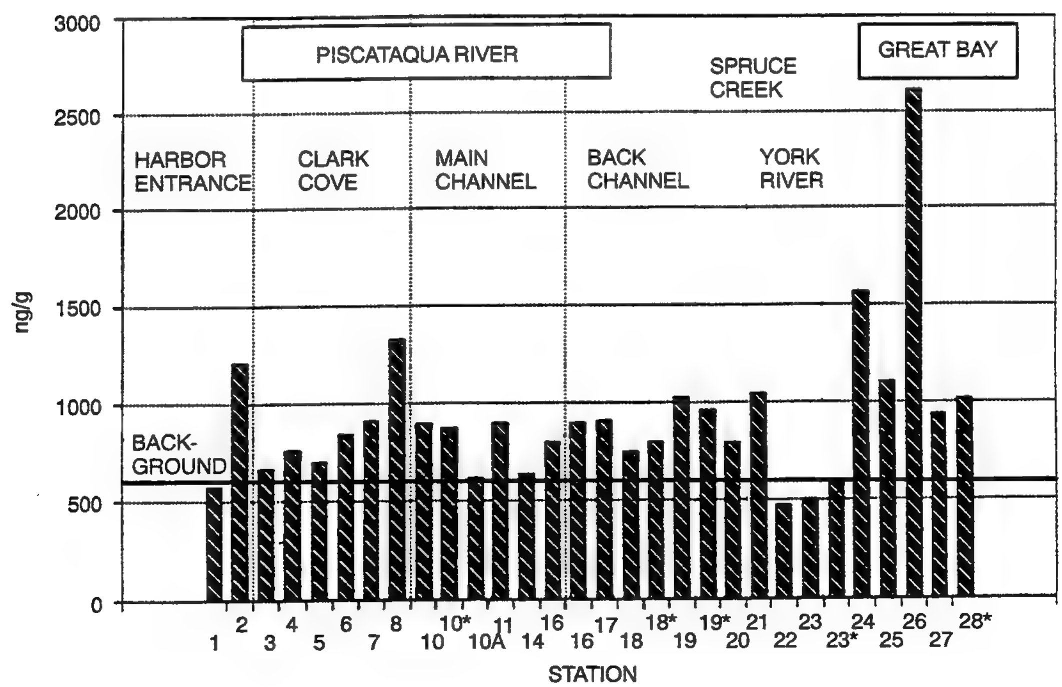

Figure 3-104. The sum of PAH compounds measured in mussels collected from the Great Bay Estuary and York River. The background PAH compound sum measured in mussels from York Harbor is also shown. (* indicates duplicate sample.)

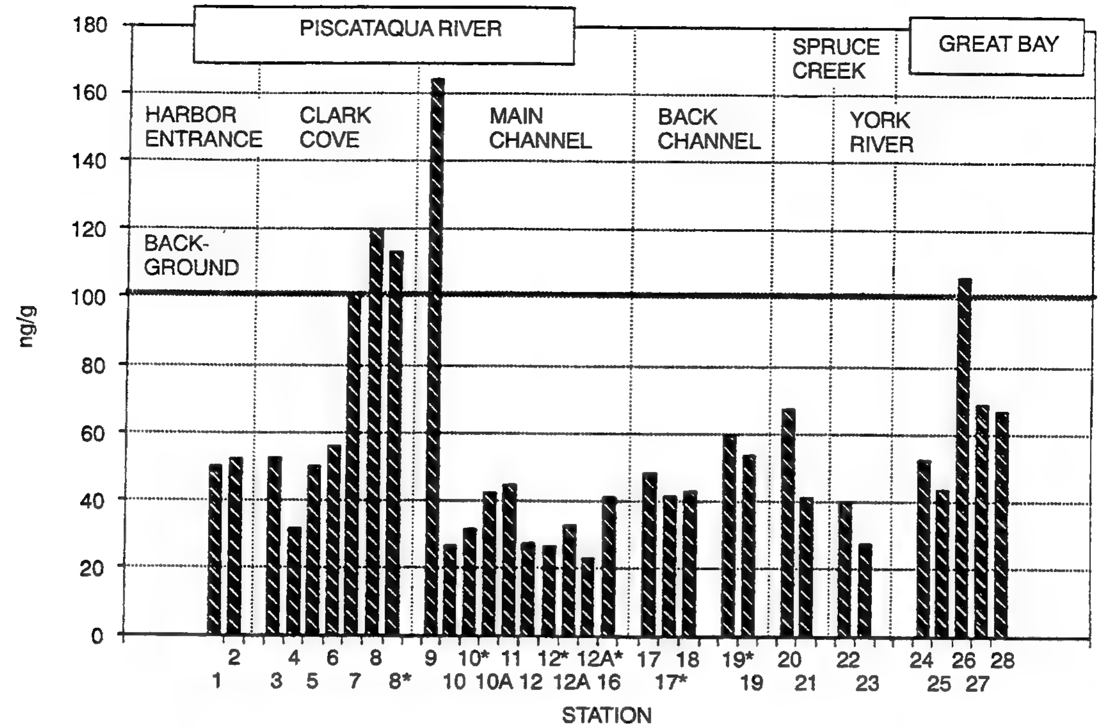

Figure 3-105. The sum of pesticide compounds measured in mussels collected from the Great Bay Estuary and York River. The background pesticide compound sum measured in predeployed mussels is also shown. (* indicates duplicate sample.)

Lobster and Flounder

The concentrations of lobster and flounder tissues are summarized for metals, PAHs, PCBs, and pesticides in tables 3-23–3-27. In general, the concentrations of most of the metals were at or below the MDLs. Of the metals that were present above MDLs, Cd, Cu, Fe, and Mn were higher in the hepatopancreas than in the tail tissue. However, Hg was much higher in the tail tissue than in the hepatopancreas tissue. Lobster hepatopancreas (tamalley) is composed of tubules, ducts, and specialized cells which secrete digestive enzymes and store glycogen, fat, and calcium (Barnes, 1980). These cells could have a higher affinity for some metals and organic contaminants than do other types of tissue. In addition, higher levels of Cu measured in the tamalley are most likely due to high concentrations of hemocyanin, a copper-containing blood plasma found only in Malacostracan crustaceans (Barnes, 1980). Mercury levels measured in lobster tail tissue were the highest for any tissue sample analyzed during the study. The reason for the high levels of Hg in the lobster tail is unclear, and will be investigated further during Phase II of the estuarine study.

Concentrations of metals measured in flounder tissue were also at or below MDLs, except for Zn (table 3-23C). Furthermore, the metal levels (excepting Zn) were all below the concentration of metals measured in flounder tissue obtained from a Narragansett Bay, RI fish market during the MDL study (Munns et al., 1992).[7]

[7]The MDL was determined from analysis of flounder tissue that was spiked with trace metals (except for As). The trace metal MDLs obtained for Ag, Pb, Cd, Cr, and Sn were higher than the metal concentration measured in the flounder matrix (see Munns et al., 1992).

Table 3-23. Inorganic elements (µg/g) measured in lobster tail, lobster hepatopancreas, and winter flounder fillet tissue samples.

(A) Lobster tail tissue (*n*=6)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	32.5	35.8	9.0	13.0	96.0
As	12.9	7.4	3.6	12.9	25.3
Cd	0.03	0.01	0.01	0.03	0.1
Cr	0.8	0.3	0.6	0.8	1.3
Cu	25.3	2.6	21.6	25.8	28.4
Fe	79.3	107.4	10.0	31.0	289.0
Pb	0.2	0.2	0.04	1.1	0.6
Mn	2.7	1.2	1.0	2.5	4.0
Hg	1.30	0.29	0.93	1.4	1.6
Ni	0.6	0.4	0.2	0.5	1.1
Zn	80.7	12.6	65.2	81.1	96.2

(B) Lobster hepatopancreas tissue (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	20.2	14.4	7.0	17.0	52.0
As	19.7	14.8	9.8	13.3	55.5
Cd	13.8	9.9	3.9	11.7	28.2
Cr	0.7	0.3	0.3	0.6	1.1
Cu	265.1	232.4	39.8	167.0	776.0
Fe	100.0	50.7	48.0	108.0	211.0
Pb	0.3	0.3	0.1	0.2	0.9
Mn	7.8	3.5	4.0	7.0	16.0
Hg	0.22	0.21	0.1	0.13	0.7
Ni	1.4	0.8	0.4	1.2	2.6
Zn	77.2	44.7	27.9	71.6	168.0

(C) Winter flounder flesh (*n*=7)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	7.0	3.6	4.0	6.0	13.0
As	6.4	1.9	3.7	7.0	8.2
Cd	0.03	0.02	0.01	0.02	0.1
Cr	0.8	0.3	0.4	0.7	1.3
Cu	1.1	0.3	0.7	1.0	1.5
Fe	19.0	7.9	9.0	22.0	27.0
Pb	0.2	0.1	0.1	0.2	0.4
Mn	1.2	1.1	0.3	0.6	3.1
Hg	0.1	0.04	0.04	0.1	0.15
Ni	0.7	0.1	0.5	0.8	0.9
Zn	33.2	6.7	24.4	33.4	42.1

Table 3-24. Average concentrations of PAH compounds (ng/g) measured in lobster tail and lobster hepatopancreas tissues.

(A) Lobster tail tissue (n=8)

Chemical	Mean	SD	Minimum	Median	Maximum
FLUORENE	34.8	42.2	1.0	20.5	130.0
PHEN	177.6	233.5	11.0	83.0	600.0
ANTH	45.3	55.7	3.0	23.0	170.0
C1	244.0	261.8	16.0	185.0	670.0
C2	243.9	253.1	15.0	200.0	710.0
C3	97.1	108.8	4.0	55.5	320.0
C4	21.3	1.8	20.0	20.0	24.0
FLUORAN	520.6	606.2	17.0	355.0	1,600.0
PYRENE	437.8	498.9	17.0	275.0	1,200.0
BAA	99.1	105.5	4.0	67.5	300.0
CHRYSENE	166.8	187.1	8.0	120.0	530.0
SUMBENZ	250.4	256.3	31.0	190.0	730.0
BEP	123.6	109.2	13.0	120.0	320.0
BAP	103.6	101.9	17.0	78.5	270.0
PERYLENE	48.8	36.9	6.0	46.5	110.0
IDEN123	35.0	24.1	17.0	25.5	78.0
DIBAHA	15.9	1.3	15.0	15.0	18.0
BGHIPER	33.5	14.8	22.0	26.0	58.0
SUMPAH	2,698.9	2,836.1	279.0	1,947.0	7,439.0

(**B**) Lobster hepatopancreas tissue (n=3)

Chemical	Mean	SD
FLUORENE	25.0	4.4
PHEN	208.7	113.5
ANTH	57.3	31.2
C1	303.3	121.0
C2	360.0	75.5
C3	121.3	84.9
C4	34.7	9.2
FLUORAN	833.3	491.7
PYRENE	686.7	445.6
BAA	172.0	180.2
CHRYSENE	252.0	204.2
SUMBENZ	526.7	366.8
BEP	286.7	184.8
BAP	247.3	190.6
PERYLENE	90.3	60.8
IDEN123	124.3	134.8
DIBAHA	24.7	9.2
BGHIPER	135.7	152.1
SUMPAH	4,490.0	2,741.1

Table 3-25. Average concentrations of PAH compounds (ng/g) measured in flounder liver and flounder flesh tissues.

Chemical	Liver (*n*=2)		Flesh (*n*=3)	
	Mean	SD	Mean	SD
FLUORENE	17.0	21.2	21.0	16.5
PHEN	11.0	4.2	12.3	1.5
ANTH	23.8	11.6	42.3	32.7
C1	34.5	41.7	25.3	3.5
C2	48.0	22.6	28.3	8.5
C3	48.0	22.6	20.3	5.7
C4	48.0	22.6	42.3	32.7
FLUORAN	9.0	9.9	15.3	4.0
PYRENE	5.5	3.5	15.0	4.6
BAA	48.0	22.6	42.3	32.7
CHRYSENE	48.0	22.6	42.3	32.7
SUMBENZ	33.5	43.1	84.7	65.3
BEP	19.5	17.7	42.3	32.7
BAP	13.2	15.3	31.7	24.6
PERYLENE	36.0	17.0	31.7	24.6
INDEN123	36.0	17.0	31.7	24.6
DIBAHA	36.0	17.0	31.7	24.6
BGHIPER	48.0	22.6	42.3	32.7
SUMPAH	564.4	179.6	603.0	375.9

Table 3-26. Average concentrations of PCB congeners (ng/g) measured in lobster tail, lobster hepatopancreas, winter flounder flesh, and winter flounder liver tissues.

(A) Lobster tail tissue (n=8)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	0.7	0.2	0.6	0.6	1.1
PCB18	1.1	1.5	0.3	0.6	4.9
PCB28	3.3	4.6	0.5	1.2	15.0
PCB52	1.1	1.5	0.2	0.8	5.1
PCB44	1.2	1.7	0.3	0.6	5.7
PCB66	3.4	4.5	0.6	2.0	15.0
PCB101	1.2	0.9	0.3	1.0	3.1
PCB118	3.7	2.2	1.5	3.6	8.2
PCB153	5.3	2.4	2.3	5.4	8.7
PCB105	2.9	1.8	0.5	2.9	5.7
PCB138	3.5	1.6	1.7	3.1	6.4
PCB187	1.0	0.5	0.5	1.0	1.8
PCB128	0.7	0.4	0.4	0.6	1.8
PCB180	1.1	0.8	0.4	1.0	3.0
PCB170	1.1	0.6	0.6	1.0	2.0
PCB195	0.7	0.4	0.5	0.6	1.7
PCB206	1.8	2.9	0.5	0.6	9.4
PCB209	1.2	1.7	0.1	0.6	5.5
SUM	35.0	22.0	14.7	27.4	80.4
TOTALPCB	70.4	42.9	30.7	55.5	158.9

(B) Lobster hepatopancreas tissue (n=9)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	40.7	47.5	1.0	29.2	149.8
PCB18	2.1	1.7	0.1	1.2	4.6
PCB28	45.9	46.4	1.0	31.0	148.9
PCB52	21.5	9.1	1.1	22.0	33.5
PCB44	4.2	2.2	1.1	4.3	8.3
PCB66	88.8	56.6	1.0	100.0	174.1
PCB101	50.2	22.3	1.1	50.8	83.0
PCB118	151.1	100.0	1.0	163.8	299.0
PCB153	291.1	115.0	30.4	326.5	410.0
PCB105	113.3	39.8	65.4	100.0	190.0
PCB138	181.9	81.0	1.1	214.4	280.0
PCB187	60.4	38.3	1.0	71.9	110.0
PCB128	64.0	29.2	17.6	60.6	119.6
PCB180	62.0	36.5	1.0	70.1	110.0
PCB170	234.4	590.7	8.6	42.1	1,809.0
PCB195	4.3	3.5	1.0	3.0	11.0
PCB206	17.7	17.9	1.0	13.2	59.3
PCB209	5.6	2.5	2.3	5.0	8.7
SUM	1,439.4	715.3	234.2	1,412.9	2,898.6
TOTALPCB	2,808.9	1,394.8	458.8	2,757.2	5,654.4

(Contd)

Table 3-26. Continued.

(**C**) Winter flounder flesh tissue (n=9)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	1.0	0.8	0.4	0.6	2.6
PCB18	0.7	0.5	0.1	0.7	2.0
PCB28	2.8	2.4	0.3	2.7	7.6
PCB52	1.4	1.1	0.1	1.4	3.6
PCB44	0.9	1.0	0.1	0.6	3.0
PCB66	5.6	6.4	0.5	5.7	21.0
PCB101	3.2	2.6	0.6	3.2	8.5
PCB118	6.4	5.7	0.6	4.0	19.0
PCB153	15.1	12.8	0.6	12.1	37.0
PCB105	3.9	3.0	0.5	3.5	8.8
PCB138	9.6	8.0	0.6	7.9	23.0
PCB187	3.3	2.5	0.8	2.7	8.1
PCB128	2.1	1.9	0.3	2.1	5.7
PCB180	4.3	3.4	0.6	3.4	10.0
PCB170	2.8	2.6	0.5	1.9	7.7
PCB195	0.7	0.5	0.3	0.6	2.0
PCB206	1.8	1.8	0.3	1.6	6.1
PCB209	1.9	1.6	0.4	1.3	4.7
SUM	67.5	53.7	16.0	56.9	173.9
TOTALPCB	133.7	104.8	33.2	113.1	341.2

(**D**) Winter flounder liver tissue (n=9)

Chemical	Mean	SD	Minimum	Median	Maximum
PCB8	38.2	31.2	8.7	27.9	85.1
PCB18	14.0	14.7	1.6	6.3	42.0
PCB28	49.9	72.3	5.6	23.0	223.8
PCB52	25.7	25.3	2.0	18.5	72.1
PCB44	13.2	15.4	1.1	4.8	42.0
PCB66	64.1	84.6	1.3	34.6	255.7
PCB101	46.2	40.5	7.1	38.1	113.2
PCB118	64.2	47.7	1.7	71.1	131.1
PCB153	134.0	103.8	1.7	159.8	259.5
PCB105	31.7	31.6	1.7	22.5	98.5
PCB138	129.4	75.9	30.7	124.6	267.9
PCB187	40.5	22.6	11.9	44.0	71.6
PCB128	30.1	20.0	8.6	28.1	62.2
PCB180	40.8	37.2	1.3	40.4	110.8
PCB170	23.1	21.9	1.3	17.5	65.0
PCB195	14.7	12.9	3.2	11.7	42.0
PCB206	28.8	15.7	11.4	29.2	49.5
PCB209	27.2	47.3	3.3	7.3	140.0
SUM	815.8	428.3	203.7	881.4	1,261.4
TOTALPCB	1,592.9	835.2	399.2	1,720.9	2,461.8

Table 3-27. Average concentrations of pesticide compounds (ng/g) measured in lobster tail, lobster hepatopancreas, winter flounder flesh, and winter flounder liver tissues.

(**A**) Lobster tail tissue (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	1.0	0.6	0.4	0.7	2.1
ACHLOR	0.7	0.4	0.2	0.7	1.3
TNONACHL	0.8	0.4	0.4	0.7	1.8
HEPTACHLOR	0.8	0.5	0.0	0.7	2.1
HEPEPX	0.8	0.7	0.1	0.7	2.3
HCB	1.9	1.4	0.6	1.3	4.8
LINDANE	0.7	0.5	0.3	0.6	2.0
MIREX	0.9	0.5	0.6	0.7	2.1
DDDOP	0.9	0.5	0.6	0.7	2.1
DDDPP	1.0	0.6	0.5	0.7	2.1
DDEOP	0.9	0.5	0.6	0.7	2.1
DDEPP	4.0	1.9	1.6	4.3	6.8
DDTOP	0.9	0.5	0.6	0.7	2.1
DDTPP	3.2	6.0	0.6	1.0	19.0
SUMPEST	18.4	9.3	8.9	16.1	39.5

(**B**) Lobster hepatopancreas tissue (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	2.3	1.8	1.2	1.5	6.5
ACHLOR	8.4	10.6	1.1	1.7	25.0
TNONACHL	49.6	24.8	1.3	49.3	88.8
HEPTACHLOR	1.7	0.5	1.2	1.5	2.5
HEPEPX	1.8	1.2	1.1	1.5	4.9
HCB	35.3	27.0	4.5	25.5	90.7
LINDANE	6.4	13.6	0.9	1.9	42.5
MIREX	1.8	0.6	1.2	1.7	2.9
DDDOP	1.4	0.3	1.1	1.3	2.1
DDDPP	55.6	33.3	1.2	49.5	115.8
DDEOP	7.3	4.8	1.5	7.2	16.2
DDEPP	553.5	255.7	4.4	566.8	911.9
DDTOP	6.7	9.9	1.2	1.5	30.4
DDTPP	16.8	24.3	1.2	12.5	77.6
SUMPEST	748.7	310.0	79.4	771.9	1,165.5

(Contd)

Table 3-27. Continued.

(**C**) Winter flounder flesh tissue (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	1.1	0.8	0.4	0.7	2.6
ACHLOR	1.3	1.1	0.7	0.7	3.7
TNONACHL	2.5	1.8	0.7	2.2	5.8
HEPTACHLOR	0.9	0.6	0.5	0.7	2.4
HEPEPX	0.7	0.7	0.1	0.6	2.4
HCB	2.8	3.1	0.4	1.0	9.6
LINDANE	0.7	0.7	0.2	0.6	2.4
MIREX	0.9	0.6	0.6	0.7	2.4
DDDOP	1.0	0.7	0.6	0.7	2.4
DDDPP	3.2	3.9	0.2	1.5	12.0
DDEOP	0.9	0.7	0.2	0.7	2.4
DDEPP	11.4	12.8	2.4	5.5	41.0
DDTOP	1.6	1.5	0.6	0.7	4.1
DDTPP	4.5	7.5	0.6	1.4	24.1
SUMPEST	33.5	22.2	10.0	23.8	73.8

(**D**) Winter flounder liver tissue (*n*=8)

Chemical	Mean	SD	Minimum	Median	Maximum
ALDRIN	16.5	17.3	2.1	7.9	50.0
ACHLOR	14.5	18.4	1.6	4.4	50.0
TNONACHL	51.5	56.3	8.4	33.4	179.4
HEPTACHLOR	11.7	18.3	0.4	2.4	50.0
HEPEPX	14.0	17.0	2.9	5.9	50.0
HCB	50.7	71.8	3.0	15.6	200.0
LINDANE	12.1	18.1	1.0	3.9	50.0
MIREX	12.0	18.2	0.6	3.3	50.0
DDDOP	97.5	233.9	2.0	9.0	674.7
DDDPP	22.3	19.9	1.6	21.5	50.0
DDEOP	18.8	19.2	1.8	12.0	50.0
DDEPP	145.2	130.8	30.0	113.7	445.3
DDTOP	12.1	18.1	1.6	3.3	50.0
DDTPP	22.3	24.8	1.6	13.5	65.8
SUMPEST	501.0	359.6	97.8	418.7	970.0

The concentrations of PAHs measured in lobster tail and hepatopancreas tissues were about 3 and 5 times higher, respectively, than PAHs measured in mussels (table 3-24). Most notable were the C1, C2, C3, FLUORAN, and PYRENE compounds. Flounder liver and flesh tissue samples had very low concentrations of PAH, and although liver analysis was hampered by small sample sizes (resulting in higher detection limits), PAHs were present at only trace concentrations (table 3-25), suggesting that PAH exposure to the flounders is very low or that the fish may be able to preferentially metabolize PAHs (Malins et al., 1988). Concentrations of PCB congeners in lobster tail tissue were comparable to levels measured in mussels; however, hepatopancreas tissues contained very high concentrations of PCB congeners (about 28 times higher than those measured in the tail tissue). Similarly, the flounder liver tissue had about 12 times more TOTALPCB than the flounder flesh tissue (table 3-26).

Except for DDEPP and DDTPP, most of the pesticide compounds measured in lobster and flounder tissues were at or below the MDL. Almost all pesticides were detected in the hepatopancreas and liver tissues (table 3-27).

Eelgrass

Inorganic concentrations measured in eelgrass are presented in Appendix L.5. During the synoptic sampling (September–October 1991), the eelgrass leaf samples were dried on aluminum foil before chemical analysis, resulting in very high Al levels in the samples. Subsequent quarterly monitoring samples were not dried on aluminum foil. The different sample handling resulted in significant differences in the inorganic concentrations measured from the dried and wet samples. Iron and manganese concentrations were also elevated in the dried samples, as were concentrations of Ni, Cr, As, and Pb. Evidence of potential sample contamination with Cd, Cu, Ag, and Zn is not as convincing, probably because these elements are not associated with aluminum foil. The archived eelgrass samples must be reanalyzed to eliminate the contaminated samples.

An inorganic analysis of eelgrass roots and leaves processed properly in March 1992 showed that tissue concentrations of metals were higher in the root materials than the leaf material except for Cd and Zn, which were lower in root tissue (table 3-28). The eelgrass samples were compared with mussels collected from the same time period at the same station locations. This comparison was made to evaluate the relative accumulation of metals between the two species. The highest concentration of Cu was measured in eelgrass leaves collected from Station 12A; the highest concentration of Cr was measured in eelgrass roots from Station 19; and the highest concentration of Pb was measured in eelgrass roots from Station 18. These preliminary results suggest that eelgrass may have accumulation rates for specific contaminants that are different from those of mussels.

Fucoid Algae

The average heavy metal concentrations measured in fucoid algae tissue are shown in table 3-28c. On average, heavy metals in algae tissue were similar to eelgrass leaf tissues, except for As. Arsenic was about 3 times higher in the algae than in the eelgrass root tissue and more than 4 times higher in the algae than in the eelgrass leaves. Arsenic concentrations were highest at Stations 19 and 10, Cu concentrations were highest at Stations 10A and 9, and Pb concentration was highest at Station 10A (Appendix L.5(e)).

Table 3-28. Inorganic elements (μg/g) measured in eelgrass leaf, eelgrass root, and fucoid algae tissue samples.

(A) Eelgrass leaf tissue, March 1992 collection (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	51.3	32.0	9.0	54.0	120.0
As	0.9	0.3	0.6	0.8	1.4
Cd	0.9	0.5	0.3	1.0	1.9
Cr	0.6	0.2	0.3	0.5	0.9
Cu	20.0	17.4	8.8	12.1	62.6
Fe	294.3	182.3	58.0	265.0	590.0
Pb	1.3	0.4	0.8	1.3	2.1
Mn	96.2	84.6	14.0	71.0	265.0
Hg	0.01	0.004	0.01	0.01	0.02
Ni	1.4	0.7	0.4	1.1	2.3
Zn	63.7	8.5	51.4	60.6	79.2

(B) Eelgrass root tissue, March 1992 collection (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	577.7	254.8	203.0	635.0	938.0
As	4.1	2.8	1.5	3.5	10.9
Cd	0.5	0.2	0.3	0.5	0.8
Cr	4.5	2.7	1.7	4.2	9.7
Cu	17.6	10.7	8.3	14.2	36.7
Fe	3,624.4	1,834.3	1,280.0	3,210.0	6,200.0
Pb	7.4	4.1	1.7	7.6	14.0
Mn	57.2	71.8	15.0	26.0	240.0
Hg	0.03	0.02	0.01	0.02	0.05
Ni	2.1	0.7	1.1	2.1	3.0
Zn	48.4	16.9	24.2	45.3	75.9

(C) Fucoid algae tissue (*n*=9)

Chemical	Mean	SD	Minimum	Median	Maximum
Al	75.8	61.5	15.0	56.0	188.0
As	14.3	10.5	2.1	12.6	27.9
Cd	0.5	0.2	0.3	0.4	0.8
Cr	0.7	0.2	0.3	0.7	0.97
Cu	14.8	10.8	1.6	13.6	31.4
Fe	165.7	61.4	54.0	159.0	244.0
Pb	2.4	4.1	0.1	1.0	13.3
Mn	51.3	35.5	11.0	38.0	118.0
Hg	0.04	0.03	0.01	0.04	0.08
Ni	1.9	1.1	0.7	1.2	3.90
Zn	93.6	56.6	37.6	65.0	197.0

DISCUSSION

The PE, MDL study, analytical screen, and interlaboratory calibration exercises were conducted to evaluate the suitability and performance of the analytical methods selected for the study. The PE and MDL study demonstrated that the methods were capable of achieving acceptable data quality, but during the actual analysis of samples, problems were encountered. MDL is defined as "the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero" (USEPA, 1982). The actual attainment of MDL for a given sample is dependent on the sample size, the amount of analyte present in the sample, and the accuracy of the analysis technique. In many cases, particularly for pesticide compounds, wide variations (sometimes greater than an order of magnitude) were reported for the attained MDL. In addition, many PCB congeners, when compared with other PCB congeners measured in the same sample, were reported at concentrations that are not normally observed in nature (D. Cobb, SAIC ERLN, personal communication). This could be caused by errors in interpreting the PCB chromatogram, which must be carefully checked to assure that peaks are correctly identified. Also problematic was obtaining the desired QA/QC limits for sample duplicates and matrix spikes. Many times widely different results were obtained for sample duplicates and matrix spike recoveries. On the positive side, there were seldom problems with blank contamination, and SRM recoveriers were acceptable for every batch validated (if the SRM recoveries were unacceptable the batch was reextracted and reanalyzed).

Many of the problems in the analytical results could be due to the inhomogeneity of the samples, the relatively low concentrations of many of the analytes (below the LOQ and MDL), and imperfections in the analytical procedures. The problems associated with not achieving the desired MDL would result in higher concentrations being assumed present than were actually measured, which would bias average concentrations (especially for sums of PAHs, PCBs, and pesticides). However, the errors would probably be on the conservative side, because if the result was not quantifiable, the limit of quantification (higher value) was reported. Furthermore, since the same methodology was used on the complete sample set, any biases present would be relatively consistent throughout the data set. Therefore, the comparisons presented in this report are valid interpretations of the results. The uncertainty in the accuracy of results is represented by the data qualifier codes used to flag the data (Appendix L).

Abnormally high concentrations of DDT were detected in many sediment samples The high concentrations of DDTPP are not usually expected in environmental samples due to its degradation to metabolites, but DDTPP or its daughters (DDE and DDD), along with a petroleum product, were found in almost all the surface soil samples that were analyzed from the Shipyard (McLaren/Hart Environmental Engineering Corp., 1992). The disposal of DDT was not identified as a contaminant associated with activities of the Shipyard (see Section 2.1), but the DDT signal could be associated with fuel oil or kerosene mixed with DDT, which was historically used for the widespread control of insects. The relatively high concentrations measured in sediments at Stations 9 and 12 could have been deposits from these sources, instances of isolated input events, or a result of anomalous chemical measurements. It is not possible to distinguish the source of the pesticide signal at this time.

Abnormally high concentrations of Hg were also measured in many of the sample matrices. The Hg levels measured could be isolated events tied to localized contamination episodes, or outliers resulting from imprecise sampling and chemical analysis. It was also problematic that Hg concentrations were at and below the LOQ and MDL. When such trace quantities are dealt

with, slight variations could result in large differences in analysis results. Additional Hg analysis, using more precise methodology, was conducted for Phase II (NCCOSC et al., 1994).

The aluminum–metal model used to evaluate sediment contamination levels showed that there were distinctly higher concentrations of metals than would be predicted from geochemical weathering. The lack of significant anthropogenic inputs (or other noncrustal sources) of Al is a key assumption required for the enrichment model. The good correlation between Al–Fe and Al–Mn supports the model's use in predicting the crustal component of the trace metals. The complete digestion of the sediment samples was necessary to ensure that all the sediment material was entirely dissolved, so that the data would be suitable for the enrichment evaluation. The Virginian Province (VP) data set was selected because (1) the Al–metal regressions were statistically evaluated to eliminate nonbackground sediment samples, (2) the VP is more similar geographically to the Great Bay Estuary than other potentially useful data sets (e.g., Windom et al., 1989), and (3) the VP data were generated using similar methods (W. Boothman, USEPA ERLN, personal communication). The application of the enrichment model to the Great Bay system could be greatly enhanced by evaluating the relationship of background samples from the Great Bay Estuary. It may be possible to obtain background samples (i.e., without anthropogenic inputs) by collecting deep sediment core samples that were deposited before the industrial revolution. Deep core samples were evaluated during Phase II of the investigation. Although enriched levels are presumably linked to anthropogenic contamination, other sources of metal inputs, such as atmospheric mineral deposition, or local geological mineral sources could also contribute to the enrichment signal.

The subsurface core samples provided a measure of contamination below the sediment surface. High reservoirs of contaminants at depth could be remobilized by bioturbation or physical mixing by storms or future dredging activities. If the core samples can be considered as measures of past contamination and surface samples as indications of current contaminations, then the following observations can be made: It would appear that heavy metal inputs of Ag, Fe, Pb, Mn, Ni, and Zn have decreased, while inputs of Al, As, Hg, and Cd have increased or remained the same. Inputs of PAHs and pesticides have decreased substantially, while inputs of TOTALPCB have increased or remained the same. These observations are highly speculative at best because many processes, such as biodegradation, bioturbation, chemical transformation and mobilization, physical mixing of the sediments (from storms and dredging), as well as anomalous chemical measurements, will interact to complicate the evidence obtained from core profiles.

The high Al, Fe, and Mn measured in seep samples from Station 2 could be indications that sediment material was in the samples, or that those compounds are also present at high concentrations. If the seep samples are accurate measures, then these samples would provide a direct measure of material migrating from the landfill. A more rigorous seep sampling scheme, using more precise sampling and analytical procedures, was completed during the Phase II investigation (NCCOSC et al., 1994).

The fact that all the contaminants of interest were measured in sediments and mussels collected from the same location allows the degree of bioavailability, or release of sediment-associated contaminants, to be inferred. The degree of bioavailability is complicated by current inputs of particular pollutants and the ability of organisms to metabolize and degrade certain classes of compounds (Pruell et al., 1986), which will also affect tissue concentrations. However, the comparison between sediment and tissue concentrations does suggest that Hg, some PCB congeners, and DDT metabolites were biologically available in the estuary.

The purpose of sampling flounder and lobster in the lower estuary was to screen for pollutants that could contaminate seafood (i.e., Food and Drug Administration Action Levels, Nauen, 1983) (see Section 4.0), provide data for the analysis of the human health risk from seafood consumption, and evaluate contaminant mobility through the food chain. Even though tissue concentrations may not have a direct effect on the organism, they provide information on exposure that can be used to determine safety factors for other, more sensitive, species.

The analysis of plant materials (algae and eelgrass) was an attempt to evaluate other routes of chemical exposure, i.e., through plant roots and leaves. This type of exposure would be different from the exposure to animals, which is mainly through gill tissue and the ingestion of contaminated food. The fact that the plants accumulated higher concentrations of some of the chemicals (Cu and As) suggests that there may be an entirely different route of exposure to those organisms. The significance of this accumulation, its implication to the trophic transfer of contaminants, and whether plants can be used as sentinels for particular types of contaminants are subjects for further evaluation.

The main assumption in the analysis of spatial contamination is that specific pollution problems will show up according to specific geographic or hydrographic attributes. The dynamic nature of the estuary, however, causes contaminants to disperse and mix in very complex and difficult to distinguish patterns. Therefore, this analysis should be viewed as an attempt to put boundaries around the problem and identify areas for more scrutiny during Phase II of the study. The analysis of very high (outliers) tissue concentrations gives another picture of pollution in the estuary. The stations where outliers were detected could be indications of localized pollution episodes, indications of contamination sources, or anomalous results obtained from imperfections in measurement procedures. Further analysis of the significance of contamination levels, their corresponding spatial distributions, and their relationship to the ecological risk assessment framework is discussed in Section 4.0.

CONCLUSIONS

Chemical contaminant analyses of sediment, tissue, and water samples from the Piscataqua River and Great Bay Estuary provide a measure of the exposure of marine organisms in these bodies of water. This exposure can then be evaluated to determine the potential risk to the ecology of the estuary (see Section 4.0). Chemical contamination levels measured in water samples were unable to indicate any current releases (or remobilization) because the concentrations of chemicals were below the detection limit of the analysis. Chemical contamination levels measured in sediments were enriched for Pb, Cr, Cu, Zn, Cd, Ag, Ni, and As, and ER-L toxicity thresholds were exceeded for Pb, Hg, Ni, Zn, Cr, PCBs, DDT, and PAHs at locations in the lower estuary. Contamination levels measured in mussels showed no differences in contaminant accumulation in deployed mussels, but statistically significant differences were detected for indigenous mussel residues for Pb and PCBs near the shipyard and Cr and PAHs for the upper Piscataqua River and the Great Bay. Indigenous mussel tissue concentrations of Pb and Cr were elevated by many times the expected background concentrations of those contaminants. Elevated concentrations of Hg were also measured at station locations in the Great Bay Estuary. Measurements of chemical concentrations in lobsters, flounders, eelgrass, and algae provided information on biological uptake (bioaccumulation) and food chain accumulation (trophic transfer or biomagnification) of the chemical pollutants, for use in the risk analysis (see Section 4.0).

3.14 ANALYSIS OF ORGANIC CHEMICAL MARKERS

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INTRODUCTION

The Portsmouth Naval Shipyard is located on Seavey Island in the lower Piscataqua River estuary in Kittery, ME. This area of the estuary is the site of much industrial and urban activity (Short, 1992) and therefore may have received inputs of contaminants from multiple sources, including the Shipyard. An ongoing survey of the area (Munns et al., 1992) has detected contaminants in the sediments of the estuary.

Chemical markers were employed in an attempt to differentiate among sources of contamination. Markers were available for several of the potential source types. To investigate potential inputs from the Shipyard, an attempt was made to identify a chemical marker (or signature) associated with the Shipyard that could be traceable in the surrounding sediments. A series of sediment samples were then analyzed for a set of marker compounds to provide information on the relative importance of various contamination sources to the estuary.

BACKGROUND

Traditional organic chemical analyses conducted on marine sediments only measure a restricted number of anthropogenic pollutants. These have generally included a number of chlorinated compounds such as PCBs, DDT series compounds, chlordanes, other chlorinated pesticides and their transformation products, and PAHs. These compounds are measured because of their environmental stabilities, tendencies to bioaccumulate, toxicological properties, and relative ease of analysis. Environmental samples, however, particularly sediments from near coastal areas, contain thousands of anthropogenic compounds. The concentrations and ratios of these chemicals may contain a wealth of additional information on the sources and history of contaminant inputs at a particular site. But, since only a small number of these are generally measured, only a small amount of the information potentially available from the chemical analysis of a sample is currently obtained.

Recently, several researchers have identified anthropogenic compounds in marine sediments that are indicative of specific pollution sources. Each of these studies has generally focused on one or more markers from a single source (e.g., sewage). We have expanded this approach to include a more comprehensive set of marker compounds (table 3-29) that are indicative of several different sources of contamination (Pruell and Bowen, 1991). The result of this research has been the identification of a set of chemical markers whose measurement provides an assessment of the relative importance of various pollution sources at specific marine locations. Brief descriptions of the markers used in this study are listed below by source type.

Table 3-29. Compounds analyzed as chemical markers.

Source	Compound Name	Abbreviations Used
Sewage	sum of the C10 linear alkylbenzenes	C10-LABs
	sum of the C11 linear alkylbenzenes	C11-LABs
	sum of the C12 linear alkylbenzenes	C12-LABs
	sum of the C13 linear alkylbenzenes	C13-LABs
	sum of the C14 linear alkylbenzenes	C14-LABs
	6-phenyldodecane	LAB65
	5-phenyldodecane	LAB74
	4-phenyldodecane	LAB83
	3-phenyldodecane	LAB92
	2-phenyldodecane	LAB101
	dioctyldecylmethylamine	C18C18-TAM
	sum of p-nonylphenols	Nonylphenol
	p-tert octylphenol	Octylphenol
Runoff	benzothiazole	BZT
	methylthiobenzothiazole	MTBZT
Atmospheric Deposition	Fluorene	FLUORENE
	phenanthrene	PHEN
	anthracene	ANTH
	9-fluorenone	9-FLU
	anthraquinone	ANQ
	C1 homologs of MW 178 PAHs	PAH178C1
	C2 homologs of MW 178 PAHs	PAH178C2
	C3 homologs of MW 178 PAHs	PAH178C3
	C4 homologs of MW 178 PAHs	PAH178C4
Petroleum	Dibenzothiophene	DBTH
	C1 dibenzothiophene	DBTH1
	C2 dibenzothiophene	DBTH2
	hopane	Hopane
Internal Standards	n-dodecylbenzene	C12LABIS
	deuterated phenanthrene	PAH188IS
	deuterated benz(a)anthracene	PAH240IS
	deuterated perylene	PAH264IS
	tridodecylamine	triC12TAM

SEWAGE

There were several potential markers for the presence of sewage, including linear alkylbenzenes (LABs), trialkylamines, octylphenols, and nonylphenols. LABs occur as contaminants in detergents containing linear alkylbenzenesulfonate surfactants. Of all surfactants currently in use, linear alkylbenzenesulfonates are presently used in the greatest volumes. In addition, because of their usage, the majority of the linear alkylbenzenesulfonate surfactants that are produced, along with the LABs, are eventually released to sewage treatment facilities (Castles et al., 1989) and then to aquatic systems (Eganhouse et al., 1983). Several studies have reported LABs in seawater and marine sediments (Ishiwatari et al., 1983; Eganhouse et al., 1988; Takada and Ishiwatari, 1991). The presence of these compounds in sediment cores has also been used to establish a historical record of sewage inputs to a marine system (Eganhouse and Kaplan, 1988).

Trialkylamines (TAMs) are a group of about ten homologous compounds which are contaminants contained in cationic surfactants used in fabric softeners. A group of investigators from Spain (Valls et al., 1989a; Valls et al., 1989b; Fernandez et al., 1991) have detected these compounds in urban wastewater, sewage sludge, seawater, marine sediments and biota. These compounds were found to be abundant in samples collected near sewage outfalls and are thought to be persistent in the environment.

Nonylphenols and octylphenols, as well as their ethoxylated derivatives, are used as nonionic surfactants in detergent formulations and are commonly found as major components of products such as laundry and dishwashing detergents. Because of this, large amounts of these compounds occur in sewage effluents and sludges (Stephanou and Giger, 1982; Giger et al., 1984). These compounds have also been detected in seawater and marine sediments (Marcomini et al., 1990).

ATMOSPHERIC DEPOSITION

High concentrations of PAHs are found in atmospheric particulate material (Simoneit and Mazurek, 1981). Some of these compounds can photooxidize to other polycyclic aromatic compounds (PACs) while in the atmosphere (Fox and Olive, 1979; Schuetzle et al., 1985). This transformation may therefore be a useful index of atmospheric exposure. Specifically, we are assessing the use of 9,10-anthraquinone, which is an oxidation product of the PAH anthracene and 9-fluorenone, which can be produced from fluorene. The ratios of these oxidation products to their associated PAHs were used to indicate the relative importance of atmospheric deposition.

URBAN RUNOFF

We used benzothiazole compounds as markers of contamination associated with urban runoff (nonpoint source). These compounds were first measured in the environment by Spies et al. (1987), who detected two benzothiazoles in sediment samples from San Francisco Bay. The authors concluded that these compounds (benzothiazole and 2-[4-morpholinyl]-benzothiazole) were degradation products and impurities of 2-(morpholinothio)-benzothiazole, which is used in the production of automobile tires. They speculated that these compounds enter marine systems associated with wear particles from automobile tires. A recent study has confirmed that benzothiazole is a stable product of the environmental degradation of substituted benzothiazole compounds used in tire manufacturing (Brownlee et al., 1992).

PETROLEUM

The concentrations and ratios of specific hydrocarbon compounds have been used extensively by the oil industry to determine the geological sources and maturities of oils (Seifert and Moldowan, 1979). These compounds have also been used to fingerprint the types of oils released to marine systems (Wakeham et al., 1980; Volkman et al., 1983; Jones et al., 1986; Takada et al., 1990). We are presently using the concentration of the pentacyclic triterpane 17a(H),21B(H)-hopane as a marker of petroleum contamination. Dibenzothiophene, a sulfur heterocyclic analog of anthracene, has been used to mark oiled sediments on the north slope of Alaska (Steinhauer and Boehm, 1992). In addition, the ratios of parent and alkyl substituted phenanthrenes and anthracenes are being used, as by Lake et al. (1979), to differentiate between petrogenic and combustion sources of PAHs.

For this study, a set of the measurements described for each source type was applied to aliquots of sediment samples collected from Portsmouth Harbor (figure 3-106) as part of an ongoing Ecological Risk Assessment of the Portsmouth Naval Shipyard, Kittery, ME. Additionally, an investigation has been undertaken of potential Shipyard site-specific chemical markers.

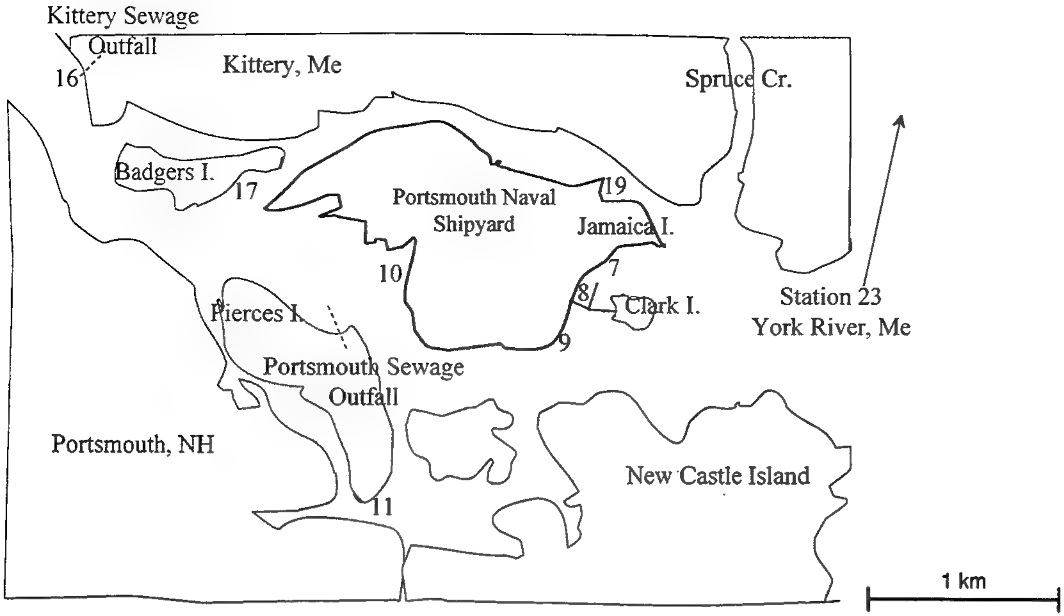

Figure 3-106. Location of stations sampled for chemical markers.

METHODS

EXTRACTION AND CLEANUP

The method used for the extraction of the sediments was modified only slightly from that used previously (Pruell and Bowen, 1991). The procedure involved adding wet sediment into a glass or stainless steel centrifuge tube with 50 ml of a mixture of 30 percent methanol in methylene chloride. An internal standard mixture containing d_{10}-phenanthrene, d_{12}-benz[a] anthracene, d_{12}-perylene, n-dodecylbenzene, 2-methyl benzothiazole, and tridodecylamine was added and the sample sonicated for 30 seconds, centrifuged, and the supernant decanted through a solvent-washed glass-fiber filter into an erlenmeyer flask. The extraction step was repeated twice more combining extracts. The combined extracts were transferred to a 1-liter separatory funnel containing 500 ml of CH_2Cl_2-extracted deionized water. The extract was then partitioned against the water retaining the CH_2Cl_2 phase. The aqueous phase was extracted twice more with 50-ml portions of CH_2Cl_2, and the combined CH_2Cl_2 extracts were then washed with an additional 500 ml of deionized water. The extract was dried over sodium sulfate and volume-reduced to 0.5 ml using a TurboVap concentrator.

The extract was then cleaned up using a chromatography column (9 mm inside diameter) containing 16 grams of activated neutral alumina. The sample was charged onto the column in CH_2Cl_2, and a whole fraction was collected as 25 ml of 15 percent methanol in methyl t-butyl ether. This fraction was volume-reduced to 1.0 ml in acetone and then treated with a small amount of activated copper powder to remove elemental sulfur.

INSTRUMENTAL ANALYSIS

The method produced a single fraction that was analyzed by GC/MS to measure marker compounds. The GC/MS instrumentation included a Hewlett Packard gas chromatograph mass selective detector equipped with a 60-meter DB-5 column (J & W Scientific, Inc.). The injector

and detector were maintained at 270°C and 300°C, respectively, and the sample was injected in the splitless mode. The mass selective detector was set at an ionization energy of 70 eV and data were collected in the selective ion monitoring (SIM) mode. Data were acquired using three separate GC/MS SIM runs. Sample quantitation was done by comparing the measured responses for the compounds of interest to the response of authentic standards using an internal standard calibration procedure. In addition to the quantitative analysis, samples were analyzed separately using the full-scan mode. Mass spectra were obtained by scanning from 35 to 550 amu at 1.1 scans per second. These analyses were conducted to facilitate the use of spectral matching routines to identify unknown compounds.

To ascertain the recovery of analytes obtained by this procedure, a sediment sample from a relatively uncontaminated environment was spiked in triplicate with a mixture containing the compounds of interest as well as representative surrogate internal standards. The recoveries were measured using an internal injection standard technique, and the results are presented in table 3-30. The compounds are grouped according to type, with the internal standards being used for their quantitation highlighted in bold. Recoveries were generally good except for some of the lower molecular weight compounds such as the benzothiazoles and fluorene. The benzothiazole data should be accurate, however, because the recovery of the internal standard used to measure these compounds was similar to that used to measure the analytes of interest. All analytes were well tracked by the internal standards used for the quantitative routines.

RESULTS AND DISCUSSION

MARKERS OF SHIPYARD ACTIVITIES

Markers were available for sewage, urban runoff, atmospheric and petroleum inputs, but not for activities specific to the Shipyard. Therefore, our first task involved an attempt to identify a marker or markers of inputs associated with the Naval Shipyard. Two approaches were used to attempt to identify markers associated with the Shipyard. The first involved an attempt to find compounds associated with cutting oils. Cutting oils were selected because they are commonly used at the Shipyard (Mike Dejardins, PNSY Personal Communication to R.K. Johnston, Sept 9, 1992) and other researchers (Campbell and McConnell, 1980) have found stable components from cutting oils in marine sediments. The second approach was a qualitative screening.

Cutting Oils

The work at the Portsmouth Naval Shipyard involves a large amount of metalworking; therefore, compounds in cutting oils may be useful as a marker of the Shipyard activity. To investigate this possibility, a sample of cutting oil (Lafayette 70) currently in use by the Shipyard was obtained and analyzed. This material was first analyzed for chlorinated paraffins because these compounds have been used as additives in lubrication and cutting oils (Darnerud et al., 1989; Bergman et al., 1984; Gjos and Gustavsen, 1982) and they may also have been detected in the marine environment. Chlorinated paraffins were not detected in the sample of Lafayette 70 obtained from the Shipyard or in sediments from around the Shipyard. This may be the result of analytical methodology, because the technique generally used for chlorinated paraffin analysis is GC/MS with negative ion chemical ionization (NICI) (Jansson et al., 1991). Since this technique was not available for this study, our analysis could not definitively rule out the presence of these compounds.

Table 3-30. Recovery of spiked analytes and internal standards from sediment matrix.

Compound	Percent Recovery			Average
	REP1	REP2	REP3	
BZT	13.5	7.21	3.11	7.94
C1BT	**12.9**	**7.46**	**3.22**	**7.86**
MTBZT	24.1	19.9	9.07	17.7
Ocylphenol	67.7	61.5	50.8	60.0
Nonylphenol	71.2	71.3	55.6	66.0
DC18	48.3	46.5	28.8	41.2
triC12TAM	**64.3**	**62.6**	**40.3**	**55.7**
C12LABIS	**91.3**	**87.2**	**61.0**	**79.8**
LAB65	77.5	72.8	52.3	67.5
LAB74	80.8	82.6	52.8	68.7
LAB83	81.3	83.0	53.3	69.2
LAB92	82.5	75.4	54.9	70.9
LAB101	85.9	80.5	58.4	74.9
DBTH	72.9	68.1	49.7	63.6
PAH188IS	**74.4**	**69.4**	**49.8**	**64.5**
9-FLU	66.9	64.0	45.2	58.7
FLUORENE	35.0	23.1	15.2	24.4
PHEN	83.7	78.7	56.5	73.0
ANQ	82.9	81.0	58.0	74.0
ANTH	75.2	69.5	50.8	65.2
Hopane	95.9	88.8	64.3	83.0

NOTE: Bold entries are internal standards used for their quantification.

The results of the analysis did show that the cutting oil in current use contained a mixture of alkylated benzenes and alkylated tetrahydronaphthalenes in addition to large concentrations of long-chain esters. The alkylbenzenes and tetrahydronaphthalenes are also found in motor fuels and oils having a low molecular weight. They would, therefore, not be a suitable chemical marker specific to the Shipyard activity. The long-chain esters would tend toward being unstable in the marine environment and thereby unsuitable for use as a tracer of metalworking activities at the Shipyard.

Qualitative Screening

A second approach was then attempted to identify markers of Shipyard activities. For this, a sample collected adjacent to a large dry dock facility on the south side of the Shipyard was selected for screening because it was thought to represent an area that could have received significant inputs from the Shipyard (Station 10, figure 3-106). The screening process identified a large number of peaks in this sample that were either unknown when their mass spectra were checked against a large library of mass spectral data for known compounds, or the fit to a library spectrum was not convincingly high. A method was developed to calculate the relative concentrations of these unknown compounds in each of the samples analyzed for this study. These

relative concentrations were then converted to a relative concentration based upon organic carbon. The relative concentrations (carbon weight) of these compounds at Stations 7, 8, and 10 were then used to winnow the resulting data set to select a group of peaks that could be markers of the Shipyard. Criteria were set such that the relative concentration (on a carbon weight basis) at Stations 7 and 8 had to exceed the concentrations at Stations 23, 17, 16, and 11. There was one peak that fit this criteria (figure 3-107). This peak was not detected at Stations 9, 11, 16, or 17, which were at a distance from the Shipyard or, in the case of Station 9, in an area potentially swept by tidal currents. This peak was detected at Station 23 in the York River, ME, at a low concentration. The organic carbon content of the sediment at Station 23 was very low—only 0.5%. Calculating concentrations based upon organic carbon content therefore results in a large concentration for compounds that are present only in minor amounts. The presence of the unknown at this station may suggest its source is not specific to the Shipyard. The compound may still have a Shipyard source on Seavey Island as well as an additional source coincident with the marina activities surrounding the York River reference site (Station 23). Additional work is required with this unknown before a definitive statement can be made relating it to the Shipyard.

OTHER MARKERS

Sewage

The chemicals analyzed in this study as markers of sewage inputs (table 3-29) are hydrophobic organic compounds that associate strongly with suspended particulate material and gradually settle out of the water column and deposit in the sediments. This results in the accumulation of these chemicals in low-energy depositional areas. The binding of the compounds is a function of the organic carbon content of the sediment. As the sediment organic carbon content varies throughout the estuary, the concentrations of these and the remainder of the marker compounds are reported as a function of the organic carbon content (nanograms compound per gram organic carbon (ng/gC)). LABs, markers of sewage contamination, were found in all 9 stations sampled as part of this survey (table 3-31). Sediments from Stations 7, 8, and 10 had relatively high concentrations of LABs, with each having greater than 50 μg/gC of the total LAB congeners (table 3-31). Station 16 sediments contained the lowest detectable concentrations of LABs.

LABs are microbially degraded in an aerobic environment (Eganhouse et al., 1988; Takada and Ishiwatari, 1991) and that degradation follows a pattern that is readily detectable. LAB isomers with the phenyl group substituted on the interior of the chain (carbons 5 and 6 for the C_{12} congeners used for this measurement, herein referred to as internal) are more resistant to microbial degradation than those isomers substituted in the 2, 3, or 4 position (herein referred to as external). The internal to external ratio (I/E) for a sample can therefore be used to quantitatively describe the degree of aerobic degradation that has occurred in a given sample. If the sediments were collected from anaerobic depositional areas, the I/E ratio may be related to the degree of transport (time exposed to an aerobic environment) that sediment particles have undergone before settling out of the water column. The concentration of the C_{12} isomers was too low at Station 23 to perform this calculation. The lowest values, corresponding to the least degradation, were found at Stations 19, 10, and 16 (figure 3-108). Station 10 is directly across the river from the Portsmouth Sewage Treatment Plant. Station 16 is downstream from the Kittery Sewage Treatment Plant. These two plants discharge directly into Portsmouth Harbor. Currently no explanation is available for the low levels found at Station 19. The distribution of total LABs (ng/gC) shows Stations 7, 8, and 10 to be accumulating the greatest amount of these

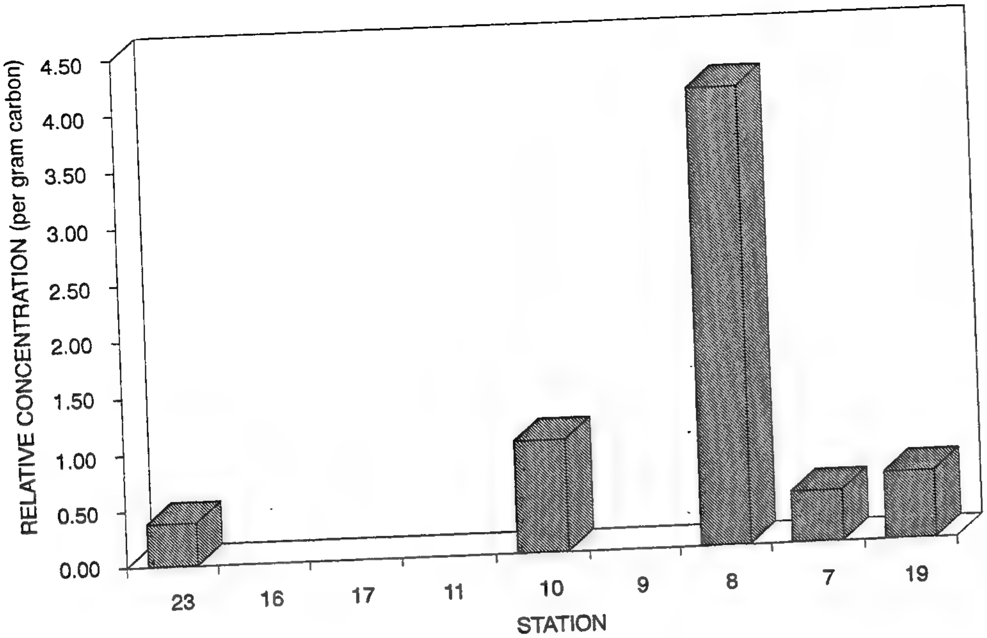

Figure 3-107. Relative concentration of unknown marker measured in Portsmouth Harbor.

Table 3-31. Sewage markers measured in ng/g carbon.

Compounds	Station								
	23	16	17	11	10	9	8	7	19
Linear Alkylbenzenes									
C10-LABs	5,740	3,250	1,600	4,630	2,280	3,680	1,790	2,060	4,850
C11-LABs	2,800	1,070	1,330	2,570	5,270	2,100	4,700	52,80	1,790
C12-LABs	515	673	1,990	2,610	8,280	2,290	8,380	9,620	1,770
C13-LABs	1,170	902	2,080	2,370	6,150	2,370	6,360	6,370	1,660
C14-LABs	506	578	1,660	1,580	3,240	1,910	4,390	4,860	1,250
Total LAB	21,400	12,900	17,300	27,500	50,500	24,700	51,200	56,400	22,700
LAB I/E	0.25	1.92	5.87	4.63	4.19	5.51	7.06	8.23	3.31
Alkylphenols and Trialkylamines									
Octylphenol	0.00	56.4	181	83.4	1,550	145	1,130	1,620	76.8
Nonylphenol	3,100	2,300	1,520	2,180	6,820	2,520	8,480	8,820	2,340
C18C18-TAM	464	8,460	3,980	19,500	3,720	7,840	16,600	10,300	10,100

sewage markers (figure 3-109). The I/E ratio of the C_{12} LABs shows Station 10 to be receiving relatively fresh sewage material compared with that being deposited in Clark Cove (Stations 7 and 8).

The distribution of the octylphenol shows maxima at Stations 7, 8, and 10, which were also high for LABs (table 3-31). Stations 17 and 9 show the next highest concentrations of this compound. A group of related compounds, the nonylphenols, show a maxima at Stations 7, 8, and 10 as well. The concentrations of the dioctadecylmethylamine (C18C18TAM) show maxima at Station 11. Stations 7 and 8 show the next highest concentrations of this sewage marker.

Concentrations of sewage markers were normalized to the highest concentration to provide relative distributions among the sites surveyed. These normalized distributions (figure 3-109) show each of these sewage marker compounds, or classes of compounds, to be distributed differently throughout the harbor. Each of these compounds may exhibit different environmental fate and transport as a result of differences in their chemical properties, and these factors contribute strongly to the observed distribution. These distributions do not always agree; however, Stations 7, 8, and 10 appear to exhibit consistently high indications of sewage impact. The sewage marker measurements do suggest that this estuary is receiving and accumulating significant inputs of sewage derived material.

Atmospheric Deposition

To determine the potential contribution of atmospheric deposition to contaminant loading in the estuary, measurements were made of two PAH compounds, fluorene (FLUORENE) and anthracene (ANTH), and their atmospheric oxidation products, 9-fluorenone (9-FLU) and anthraquinone (ANQ). The mole ratio of each oxidation product to its respective parent was then calculated (table 3-32). Stations 7 and 8 showed the highest potential inputs from atmospheric deposition (figure 3-110). Sediments from Stations 16, 11, and 19 also contained relatively high levels of the 9-FLU/FLUORENE marker and a lower level of the ANQ/ANTH marker. The interpretation of these ratios was complicated by additional sources of PAHs to the system that can affect the ratios. Additional work will be required to fully implement these measurements as definitive markers of atmospheric deposition.

Urban Runoff

The concentrations of benzothiazole (BZT) and methylthiobenzothiazole (MTBZT) are used in this study as chemical markers of urban runoff. Measurable concentrations of these markers were found in each of the samples analyzed (table 3-32, figure 3-111). The distribution of these compounds varied considerably within the estuary, with values ranging from a low of 1250 ng/gC at Station 23 to a high of 13,100 ng/gC at Station 7. Stations 9, 11, and 19 all showed high levels of this marker. The high value for Station 7 may be a result of a local input that is not readily identifiable. The high values at Stations 16 and 19 occur in areas presumably not well flushed and may have local sources. In summary, however, the distribution of this marker shows no easily identifiable pattern.

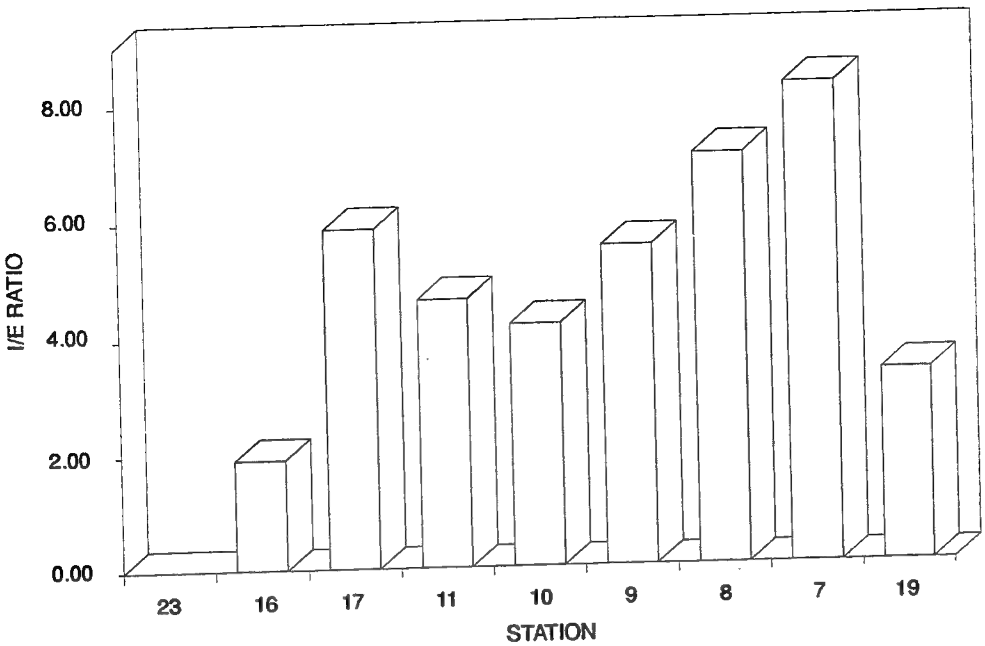

Figure 3-108. LAB internal-to-external ratios.

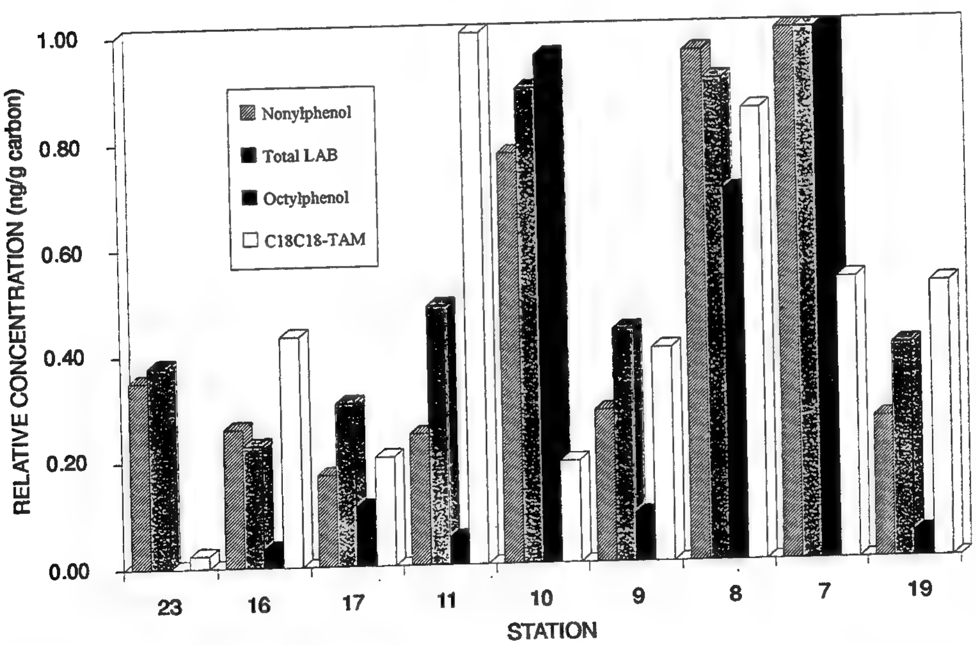

Figure 3-109. Normalized sewage markers measured in Portsmouth Harbor.

Table 3-32. Chemical markers of atmospheric deposition and urban runoff in ng/g carbon.

Compounds	Station								
	23	16	17	11	10	9	8	7	19
Atmospheric Deposition									
9-FLU/FLUORENE	0.361	0.706	0.476	0.589	0.480	0.265	0.813	0.755	0.881
ANQ/ANTH	0.513	0.335	0.392	0.191	0.463	0.140	0.976	0.739	0.431
Hom/Par*	0.670	1.13	1.44	2.20	1.43	0.846	1.26	1.11	1.98
Urban Runoff									
BZT	1,250	1,600	2,400	6,280	3,360	6,520	3,040	13,100	6,340
MTBZT	1,270	966	828	564	1,760	980	1,310	1,450	2,460

*Ratio of the concentration of the alkyl homologs of the MW 178 PAHs to the parent MW 178 PAHs.

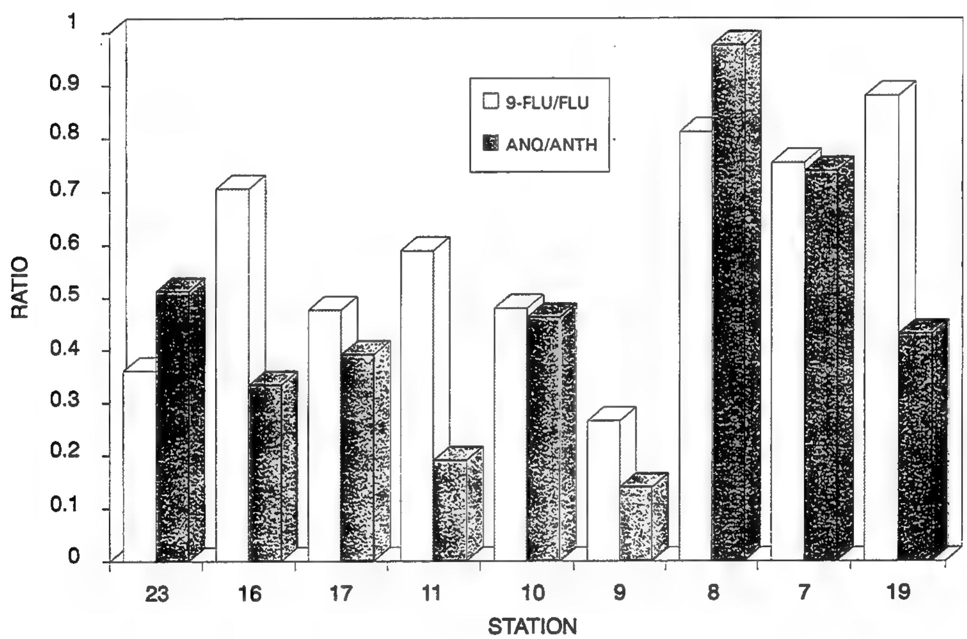

Figure 3-110. Atmospheric deposition markers measured in Portsmouth Harbor.

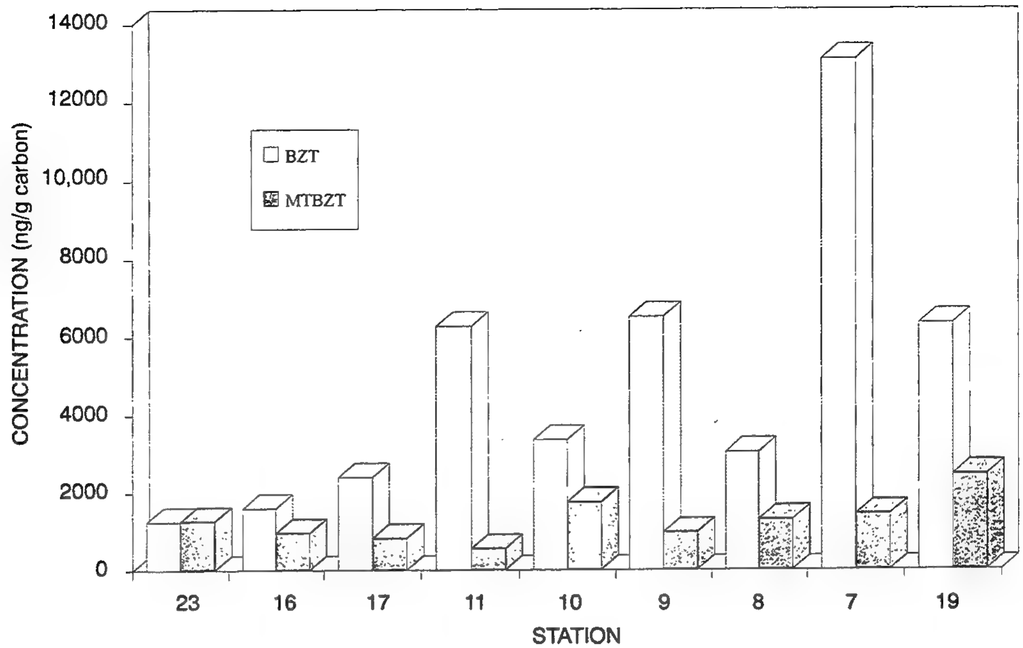

Figure 3-111. Benzothiazoles measured in Portsmouth Harbor.

Petroleum Products

A petroleum marker, hopane, was used to indicate the amount of higher molecular-weight petroleum mixtures (e.g., crankcase oil or crude oil) impacting particular locations. The ratios of the alkylated to parent phenanthrenes and anthracenes (Hom/Par) were used to differentiate between petrogenic and pyrogenic sources for the PAHs. Additionally, the sum of dibenzothiophene, a C_1 and a C_2 dibenzothiophene, was calculated and used as an additional indicator of petroleum inputs (table 3-33, figure 3-112). The results of the analysis for hopane indicate that Stations 17, 7, and 8 reflect the greatest inputs from high-molecular-weight oils. Stations 9 and 10 also have high levels of this marker.

Table 3-33. Chemical markers of petroleum inputs in ng/g carbon.

Compounds	Station								
	23	16	17	11	10	9	8	7	19
DBTH	2,140	1,750	2,440	3,090	1,520	3,360	818	951	1,040
DBTH1	3,000	2,660	4,090	4,290	2,850	3,680	1,660	1,650	1,760
DBTH2	6,770	5,360	7,740	8,680	5,140	9,610	2,900	3,160	3,270
Sum DBTH	11,900	9,770	14,300	16,100	9,510	16,700	5,380	5,760	6,070
Hom/Par*	0.670	1.13	1.44	2.20	1.43	0.846	1.26	1.11	1.98
DBTH/178	0.120	0.150	0.161	0.143	0.184	0.101	0.194	0.165	0.145
Hopane	3,000	4,420	13,100	6,000	7,360	7,250	8,910	10,000	4,370

*Ratio of the concentration of the alkyl homologs of the MW 178 PAHs to the parent MW 178 PAHs.

The sum of the dibenzothiophenes was elevated significantly at Stations 9 and 11 relative to the other stations near the Shipyard. These compounds occur frequently as components of crude oils, suggesting that Stations 9 and 11 may have received inputs from a different petroleum source than, for example, Stations 7, 8, and 19. Stations 17 and 23 also show elevated concentrations of Sum DBTH. The ratio of alkyl homologs of the phenanthrenes and anthracenes to the parent phenanthrenes and anthracenes is low for atmospheric inputs resulting from combustion processes. Figure 3-112 shows Hom/Par to be low at Stations 23 and 9, suggesting that pyrogenic products were a source material to these stations. The Hom/Par ratio was highest at Station 19 and 11, indicating low-molecular-weight petrogenic material as a potential source. The data available for the set of petroleum markers indicate Stations 17, 7, 8, and 10 accumulated petrogenic material (figure 3-112). The relatively high ratio of DBTH/178 (table 3-33) indicates relatively fresh petroleum inputs at Stations 8, 10, 7, and 17 as well.

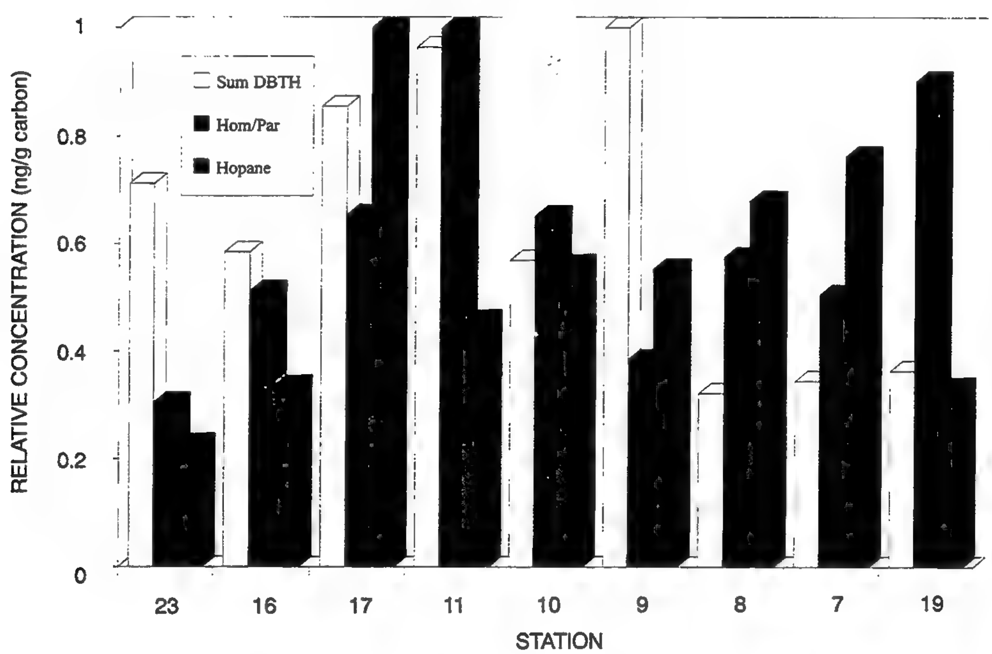

Figure 3-112. Normalized petroleum markers measured in Portsmouth Harbor.

CONCLUSIONS

This study was undertaken to provide information on the relative importance of various contaminant sources to Portsmouth Harbor. The input sources investigated included the Portsmouth Naval Shipyard, sewage inputs, urban runoff, atmospheric deposition, and petroleum releases.

Attempts to discover a specific chemical marker of inputs from the Shipyard have, so far, proved unsuccessful. Specific compounds found in cutting oils were targeted but were not detected in the sediments or in the sample of cutting oil in use by the Shipyard. Sediment extracts were also screened for unknowns that could be used as markers of the Shipyard activities. This screening involved approximately 55 compounds selected in the extract from a station adjacent to the Shipyard. By using specific criteria selected to identify potential markers of the Shipyard, this was reduced to one compound, which remains unidentified, that could

potentially be a marker of Shipyard activity; however, no definitive markers of the Shipyard were found.

Several chemical markers of sewage inputs were used in this study. Significant concentrations of sewage markers were detected in many of the samples from the estuary. From these results, it appears that Portsmouth Harbor receives substantial inputs of sewage material. The concentration of the chemical marker of urban runoff, benzothiazole, was anomalously high at Station 7. This marker appears high at Stations 9, 19, and 11 as well. Atmospheric deposition marker levels indicate a significant contribution at three sites (Stations 7, 8, and 19). The contribution from petroleum sources in the harbor appears to be significantly elevated at Stations 7, 8, 9, 10, and 17, which are all adjacent to the Shipyard.

In summary, chemical marker measurements were made on surface sediment samples collected from Portsmouth Harbor. Results from these measurements suggest significant sewage inputs to the Portsmouth Harbor area, while only minor influences of atmospheric deposition and urban runoff were indicated. Widespread contamination specifically tied to activities at the Portsmouth Naval Shipyard was not detected. The only possible indication of organic inputs related to Shipyard activities were petroleum inputs, which were detected at several stations adjacent to the Shipyard.

4.0 ESTUARINE ECOLOGICAL RISK ASSESSMENT PROBLEM FORMULATION: SYNTHESIS OF PHASE I FINDINGS

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INTRODUCTION

This section reviews the findings of the research and monitoring activities described in the previous sections (Sections 3.1 to 3.14) within the context of the ecological risk assessment framework Problem Formulation developed in Section 2.0. Problem Formulation is the initial step in the ecological risk assessment process. It provides a structure for organizing and interpreting data on the characterization of the stressors, the spatial patterns of exposure, and ecological effects. The conceptual model developed as part of the Problem Formulation process uses information on the stressors of concern, important exposure pathways, and the cooccurrence of stressors with ecological systems and endpoints. The model uses this information to define the spatial, temporal, and ecological boundaries of the assessment and identify the potential ecological risks and their causes for the specific problem setting.

The analyses of stressor levels (exposure) and ecological data presented in this section identify the spatial patterns and magnitude of contamination and cooccurring ecological effects which provide the basis for (1) revising the initial conceptual model developed for this site (Section 2.0), (2) identifying specific ecological systems potentially at risk and endpoints to be used in the assessment, (3) identifying the types of data and analyses that will be required to fully characterize the ecological risks and associated uncertainties, and (4) developing the appropriate lines of evidence for linking stressor–effects relationships to specific sources. The ecological risk assessment information can be used by environmental managers to identify

contamination levels that are protective of marine resources (Media Protection Standards), and to identify areas where more information is required (Data Gaps) to reduce the uncertainties in the assessment.

The results obtained during each investigation (Section 3.0) are organized and presented using the major components of Problem Formulation (see figures 2-3 and 2-4) within the risk assessment framework (USEPA, 1992). These studies have identified the locations and assessed the status of important ecological resources in the estuary (figure 4-1). Geographic areas that appear to be under ecological stress have also been identified (figure 4-2). Data are interpreted within the context of the conceptual model which identifies (1) stressors of concern, (2) stressor spatial distribution patterns (that is, the conceptual model identifies those ecosystems in which stressors are elevated and are therefore a potential problem), and (3) the ecological responses (endpoints) used to determine the extent and magnitude of risks.

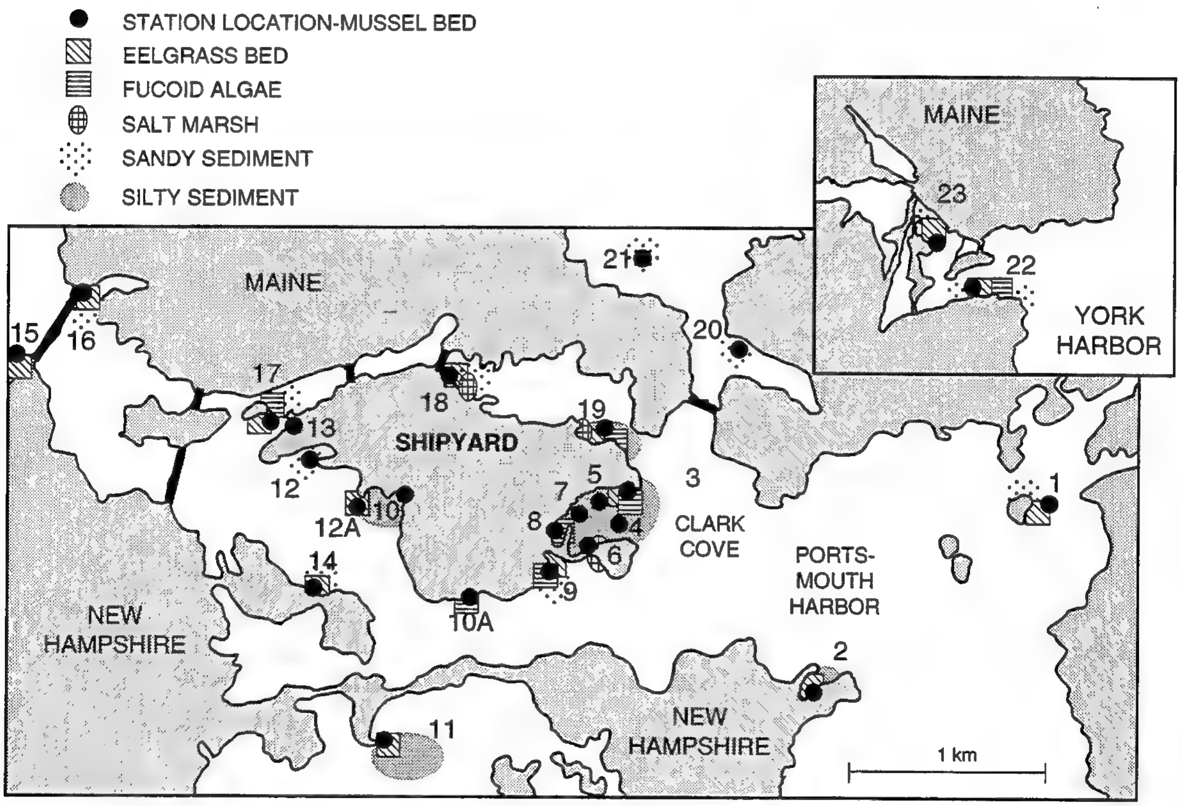

Figure 4-1. Ecologically important habitat types sampled in the lower Piscataqua River.

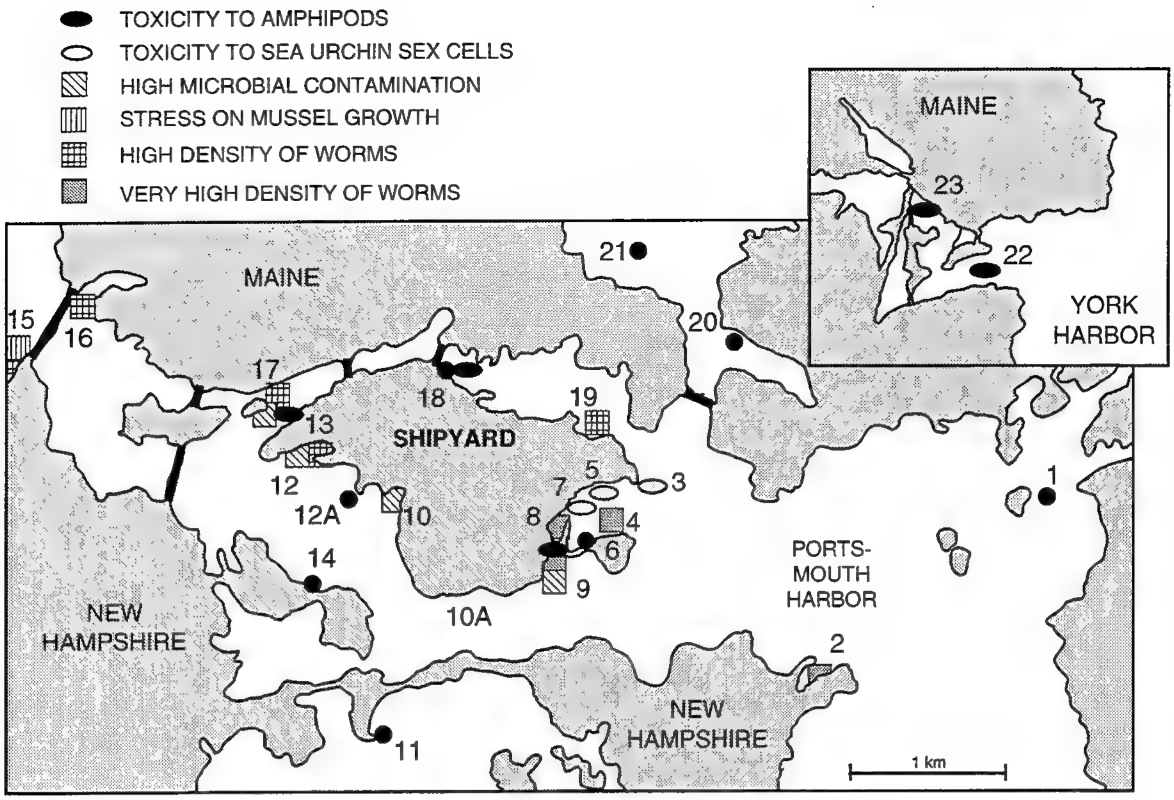

Figure 4-2. Indications of ecological stress in the lower Great Bay Estuary.

STRESSOR CHARACTERIZATION

RANKING SCHEME

Stressors were characterized by ranking the relative importance of chemical contamination levels and determining the spatial distribution of contamination. The ranking scheme was based on (1) identifying which stressors are most important based on sediment chemistry and tissue residues, and (2) examining the spatial distribution of contamination to ascertain which sites have the elevated contaminants and are of potential concern.

The ranking scheme that follows was developed for evaluating the chemistry results reported in Section 3.13. A determination of the magnitude of chemical contamination in particular areas of the estuary, was developed to determine the relative significance of contaminant concentrations and identify the most important contaminants of concern (from the hundred compounds measured, see table 3-10) for use in the risk analysis. Stations grouped according to geographic and hydrographic similarities included locations around Seavey Island (Clark Cove, Main Channel, and Back Channel); the Piscataqua River reference stations (upstream and downstream of Seavey Island, Spruce Creek, and Pierces Island); stations in the York River; and a combination of stations located in the upper Piscataqua River, Little Bay, and Great Bay. The metrics used to develop this ranking scheme were (1) the magnitude of sediment enrichment for metals above geologic background using the aluminum-crustal normalization method (Windom et al., 1989; see Section 3.13), (2) the incidence of sediment concentrations above ER-L toxicity thresholds

developed by Long and Morgan (1990), and (3) the magnitude of elevation in contaminant residues in the tissue of the blue mussel (*Mytilus edulis*).

The qualitative determination of the degree to which the contaminant signal was detected in each area was obtained for indications of enrichment, exceeding ER-L toxicity thresholds, and mussel residues by the following scales:

Enrichment

●●●●●	Enriched at levels ≥10 times the upper bound of the crustal-ratio relationship (upper bound).
●●●●	Enriched at levels ≥5 and <10 times the upper bound.
●●●	Enriched at levels ≥3 and <5 times the upper bound.
●●	Enriched at levels ≥2 and <3 times the upper bound.
●	Enriched at levels ≥1 and <2 times the upper bound.
+	Levels below upper bound.
–	No deviation from crustal-ratio relationship.

Toxicity Thresholds. For toxicity thresholds, a star was assigned for each station in a group that exceeded the ER-L concentration for that contaminant.

Mussel Residues. Two results were evaluated with respect to the mussel tissue residues: (1) the level of significance determined from ANOVA of differences between station groups based on geographic and hydrographic groupings, and (2) significant differences detected between groups, according to statistically similar groups obtained from the analysis of least significant difference between the groups (Section 3.13). Boxes were assigned to indicate both results. The shading of the box corresponded to the ANOVA significance level

= 0.05   = 0.01   = ≤0.001

and the number of boxes was assigned according to groups, ordered by descending means, with three boxes assigned to the group with the highest mean residue value, and a box subtracted for each subsequent group. For chemicals that were not significantly different between groups, a plus (+) and minus (–) indicated that the group mean was above or below the average concentration for the estuary. Specific stations with extremely high tissue concentrations were noted in parenthesis.[1]

Another view of mussel contamination levels was obtained by plotting the relative distribution of tissue residues normalized to background concentrations. The background concentrations for mussels were obtained from the predeployment mussels that were collected from an area known to be free of contamination (Sandwich, MA), during the same time period that the indigenous mussel samples were collected from the Great Bay and Piscataqua River Estuary, and analyzed using the same analytical methods (see Sections 3.11 and 3.13). Background units (BUs) were obtained by

[1] For example, Pb concentrations in mussel tissues were statistically different between groups (significant at p=0.013, ▒), and the highest concentrations were measured in Main Channel, followed by Clark Cove, Back Channel, PR, GB, and YR. Station 10A is noted because tissue concentrations were 11 times above background (see table 4-1; see also table 3-21).

$$BU = C_t/B_t$$

where

C_t = indigenous mussel chemical tissue concentration

B_t = background chemical tissue concentration determined from the predeployed mussels

Table 4-1. Summary of significant findings for chemical residue in sediments and biota tissues.

Heavy Metal Contaminant	Clark Cove	Main Channel	Back Channel	PR Ref.	YR Ref.	GB Ref.
Pb						
Enrich.	●●●●	●●●●	●●●	●	–	
ER-L	*****	*****	***	*	–	
Mussel	▒	▒ (10A)	▒	▒	–	+
Hg						
Enrich.	●●●●●	●●●●	●●●	●●	●	
ER-L	****	****	**	***	–	
Mussel	–	+(10)	+(19)	–	–	+
Zn						
Enrich.	●	●●	●	–	–	
ER-L	****	**	*	–	–	
Mussel	+	+(10)	–	+	–	+
Ni						
Enrich.	●	●	●	–	–	
ER-L	****	*	–	–	–	
Mussel	▒ (8)	+	▒	+	–	▒ (26)
Cr						
Enrich.	●●●	●●	●●	●●	–	
ER-L	**		–	*	–	
Mussel	■	■	■	■	–	■
Cd						
Enrich.	●●●	●	●●●●	–	–	
ER-L	–	–	–	–	–	
Mussel	–	+	–	+(21)	–	+
Cu						
Enrich.	●●	●●	●	–	–	
ER-L	–	*	–	–	–	
Mussel	–	(12, 12A)	–	–	–	*(26)
As						
Enrich.	●●●●	●●●	–	●	–	
ER-L	+	+	–	–	–	
Mussel	+	–	+	–	–	–

(Contd)

Table 4-1. Continued.

Heavy Metal Contaminant	Clark Cove	Main Channel	Back Channel	PR Ref.	YR Ref.	GB Ref.
Ag						
Enrich.	●●●●	●●●	●●	●●	●	
ER-L	*	–	–	–	–	
Mussel	+(8)	–	+(17)	+(20)	–	+(24, 26)
PCB						
ER-L	**	***	*	*	–	
Mussel	▒	▒ (12)	▒	▒	–	▒ (26)
PAH						
ER-L	–	*(12)	*(18)	*(2)	–	
Mussel	+	+	■	■	–	■ (26)
PEST						
ER-L	*(8)	*(9)	*(12)	*(18)		
Mussel	+	–(9)	–	–	–	+

NOTES:
- ● Degree of metal enrichment in sediment (see p. 4-3 for enrichment scale).
- * Occurrences of exceeding ER-L toxicity threshold.
- \+ Above average concentration for estuary.
- – Below average concentration for estuary.
- ■ Statistically significant accumulation in mussel tissue (see p. 4-4 for the ANOVA significance level).

Numbers in parentheses are stations with extremely elevated concentrations.

CONTAMINANTS OF CONCERN

The analysis of chemical contaminant concentrations in sediment, water, and mussel tissue samples indicated that Pb, Hg, Zn, Ni, Cr, and to a lesser degree PCBs are contaminants of concern in the estuary (table 4-1). Strong indications of Pb enrichment, the exceedance of ER-L toxicity thresholds in sediments, and highly significant mussel residue levels were measured at most stations in the lower estuary adjacent to Seavey Island. Zinc was significantly enriched above ER-L toxicity thresholds for Clark Cove and Main Channel stations near Seavey Island. Mercury was also at levels above ER-L toxicity thresholds. However, statistically significant differences between geographical groupings were not found for mussel tissue concentrations of Zn or Hg. Statistically significant different groupings were found for Cr and Ni, with the highest accumulation occurring at the upper estuary stations (table 4-1; see also table 3-21). Mussel tissue residues were elevated above background concentrations for Pb at almost all stations in the lower estuary (figure 4-3). Mercury concentrations were also elevated in the lower estuary, but were measured at concentrations above background in the upper estuary and York Harbor as well. The Hg distributions must be interpreted with caution, because residue levels measured were very near the analytical detection limits for these contaminants. Therefore slight variations in analytical accuracy may result in large differences in the magnitudes shown in figure 4-3. The ecological significance of Pb and Hg contaminations in the lower estuary will be addressed during the Phase II estuarine investigation.

Surface sediment contamination levels of pesticides, PAHs, Cd, Cr, Cu, Pb, Ni, and Zn were lower than contamination levels measured deeper in sediment core profiles (see Section 3.13).

The lower surface concentrations suggests that inputs of these contaminants may have decreased over time or that there has been dilution through the deposition of cleaner sediments. Increased levels of PCBs, As, Hg, and Ag in the surface sediment relative to the core profiles could be indications that there are still inputs of these contaminants into the lower estuary. However, there is uncertainty associated with this interpretation. Many processes, such as biodegradation, bioturbation, chemical transformation and mobilization, physical mixing of sediments (from storms and dredging), as well as anomalous chemical measurements, could affect the contaminant distributions observed (Section 3.13). During Phase II, uncertainties related to bioturbation and the mixing of sediments will be addressed using geochemical dating techniques. Also, the assimilative and detoxifying capacity of sediments and shoreline substrates of Seavey Island will be evaluated during Phase II of the estuarine study.

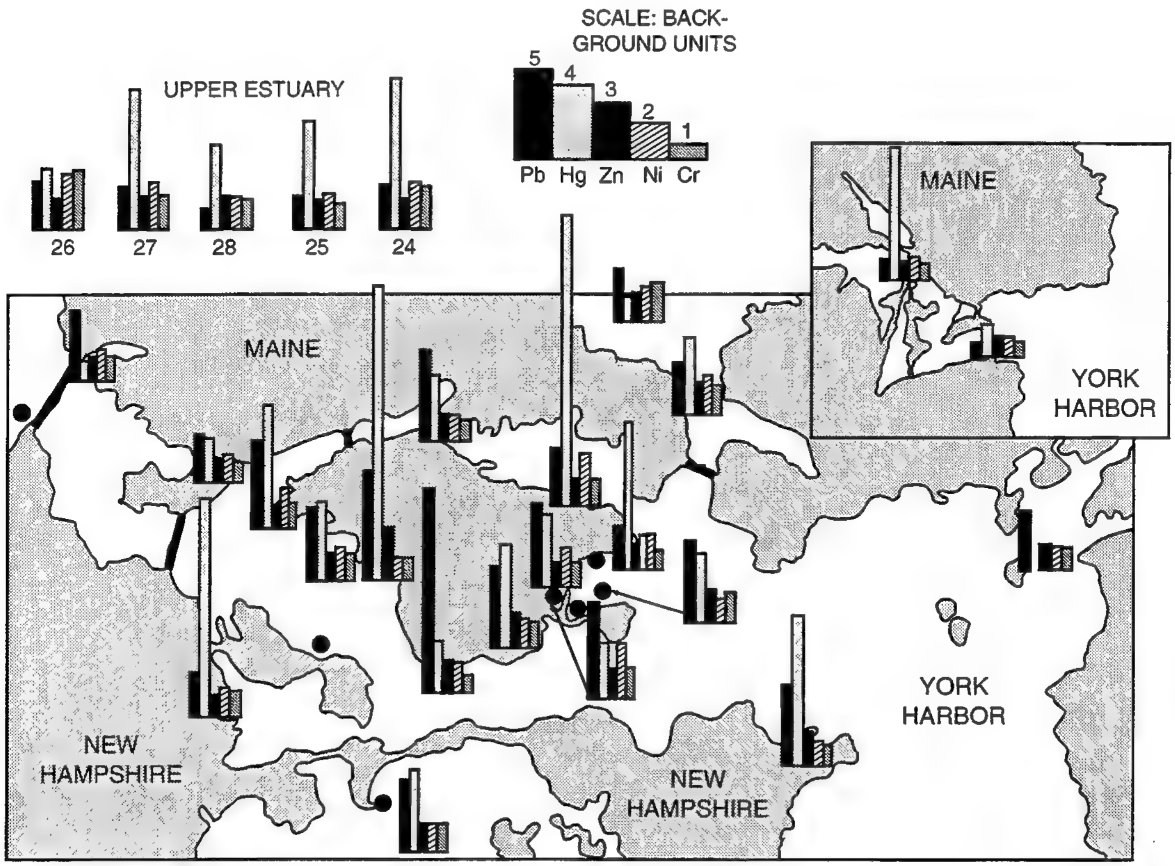

Figure 4-3. Heavy-metal contamination in mussel tissues from the Great Bay Estuary.

The results from the stressor characterization analyses indicate that there are areas around Seavey Island, specifically Clark Cove, Main Channel, and Back Channel, that are potentially of concern based on elevated levels of lead, PCBs, and perhaps mercury (table 4-1). The areas of deposition around Seavey Island contain fine-grained sediment which require a modification of the initial conceptual model proposed in Section 2.0. Further, these data suggest that the risks from contaminant sources in the area will be primarily associated with benthic ecosystems and their potential linkages to human health through important commercial species of fish and shellfish.

ECOLOGICAL RESOURCES

A summary of the significant findings on the status of each assessment endpoint is presented in table 4-2. The main habitat types identified are fine-grained depositional areas (including eelgrass beds and salt marshes) and higher energy, rocky shorelines (characterized by rockweed algae and mussel beds (figure 4-1)). The main objective was to identify and quantitatively sample depositional areas, or those areas where fine-grained sediments accumulate. Fine-grained sediments have a much greater affinity for heavy metal and organic contaminants (NOAA, 1991b; Corbin, 1989) than do coarser, sandy sediments. Fine-grained material is most likely to accumulate in areas that are physically constricted (Clark Cove) or that have macroflora, such as eelgrass beds or salt marsh grasses, which can trap and accumulate suspended sediment particles (Short, 1992; see Section 3.1). These eelgrass beds are important nursery grounds for juvenile fish and lobster, and provide a rich source of nutrition and potential vectors for the contamination of a wide variety of birds, fish, and invertebrates (Short, 1992). High-energy areas, characterized by rocky outcrops covered with fucoid algae, represent a different ecological zone and also have important functions in the estuary (Short, 1992), but are less likely to accumulate elevated contaminant concentrations than are soft bottom communities.

PELAGIC COMMUNITY

Phytoplankton biomass was estimated by standing stock of chlorophyll *a* (CHL) and pheaophytin (PHEAO), and flounder distribution and abundance were used to assess the health of the pelagic community in the lower estuary (table 4-2). Primary productivity was relatively low during the September 1991 sampling period, although levels of CHL and PHEAO were well within the expected range for the fall season and were not statistically different among stations (Section 3.3; R. Langan, UNH JEL, personal communication). Seasonal patterns measured from the monthly sampling from September 1991 to July 1992 showed maximum CHL levels in late spring and early summer, which is consistent with patterns reported for temperate estuaries (Nixon and Pilson, 1983; Pilson, 1985). Primary productivity will continue to be monitored to obtain data on a complete annual cycle of pelagic productivity in the estuary (NCCOSC et al., 1994).

Flounders are primarily bottom-feeders and they spend much of their life directly in contact with bottom sediments. Therefore, as an endpoint representative of estuarine fish, flounder have a higher potential for chemical exposure than other fish species, such as bluefish (*Pomatomus saltatrix*) or striped bass (*Morone saxatilis*), that may be present in the estuary (Short, 1992).

However, results from the flounder sampling were inconclusive, suggesting that the sampling period was not optimal, or that there was an overall reduction in flounder abundance during the sampling period (Section 3.9). The chemical analysis of flounder tissue showed barely detectable chemical contaminant residues that were, in fact, below contaminant levels measured in flounder obtained from a Rhode Island fish market (Section 3.13; Munns et al., 1992). The flounder population will be resampled during optimal periods when flounder are known to be present in the estuary, to reassess abundance and confirm tissue residue levels (NCCOSC et al., 1994).

Table 4-2. Significant Phase I findings for assessment endpoints. Significant findings are indicated by bullets (•). Phase II activities are identified by dashes (–).

Assessment Endpoint Measurement Endpoint	Finding
PELAGIC COMMUNITY	
Phytoplankton Biomass	•Within Normal Limits – Continue monitoring
Flounder	•Tissue Residues Low – Resample to measure abundance and confirm tissue residues
BENTHIC COMMUNITY	
Infauna	•Very High Densities Identified •High Densities Identified – Confirm finding and assess significance
Epibenthic	
Lobsters	•Very Abundant With Significant Recruitment •Bioaccumulation Evident •Below FDA Action Levels – Assess bioaccumulation potential – Delineate important nursery and reproductive habitat
Fucoid Algae	•Within Normal Range •Tissues May Preferentially Accumulate Cu
Mussels	•Bioaccumulation Evident (Pb, Hg, Cr) SAbundance/Density Within Normal Range •Tissue Residues Used to Help Identify Contaminants of Concern (see table 4-1) – Confirm outliers and assess significance of residues
EELGRASS COMMUNITY	•Abundance/Morphology Within Normal Range •Eelgrass absent from Clark Cove •Good Habitat Quality •Tissues Accumulated Cu, Cr, Pb – Continue monitoring and assess significance of residues
SALT MARSH COMMUNITY	– Data Gap for Phase II Assessment

(Contd)

Table 4-2. Continued.

Assessment Endpoint Measurement Endpoint	Finding
WATER QUALITY	
DO, Salinity, pH, Temperature	•Within Normal Range
Nutrients	•Excess Nutrients (NO_3)
Microbes	•Prevalent Sewage Input
Hydrodynamics	•Significant Flushing in Lower Estuary – Calibrate/Validate hydrodynamic and transport models – Determine dynamics of estuarine water movement
Sea Urchin Fertilization	•Toxicity Detected
Contamination Levels	•Water-Column Data Quality Objective Not Achieved •Heavy Metals in Seep Samples – Resample with appropriate methods and determine loading rates from seeps
Deployed Mussels	•Physiology Within Normal Range •No Appreciable Accumulation of Contaminants
SEDIMENT QUALITY	
Geophysical	•Depositional Areas Identified – Develop sediment distribution map – Determine sedimentation dynamics
Amphipod Mortality	•Toxicity Detected – Assess significance
Microbes	•Sewage Input Identified – Determine sources
Contamination Levels	•Areas of Elevated Contamination Identified – Determine sources and assess significance •Contaminants of Concern Identified (see table 4-1) – Assess assimilative and detoxifying capacity of sediments and shoreline substrates – Determine levels protective of marine organisms
Chemical Markers	•No Unique Shipyard Marker Identified •Significant Sewage Input in Portsmouth Harbor •Evidence of Runoff, Atmospheric, and Petroleum Inputs – Assess historical trends of source inputs – Determine marker disposition and deposition rates

BENTHIC COMMUNITY

Infaunal Organisms

Stressor impact to benthic infaunal communities was indicated by high (>50,000 organisms/m^2; Stations 17, 12, and 19) and very high (>90,000 organisms/m^2; Stations 8, 4, and 2) abundances of polychaete worms (*Streblospia bendicti*) (figure 4-2; see Section 3.12). Benthic communities that are dominated by extreme abundances of polychaete worms have been linked to pollution stress, particularly when organic enrichment is due to sewage discharge (Levin, 1984). Additional analyses of benthic infaunal communities will be conducted in Phase II.

Epibenthic Organisms

The health of the epibenthic community was assessed by sampling lobster, fucoid algae, and mussels. High abundances of all three species were present in the lower estuary and provided ample material for assessing stressor impacts. The age-class structure of the lobster population consisted of large numbers of small animals and few adults. These data suggest that although adults were subjected to high fishing pressure, recruitment was high (Section 3.9).

Lobster tissue residue analysis suggested that lobsters accumulated specific contaminants (Hg in tail tissue and organic contaminants in the hepatopancreas tissue). The life history of lobster, fairly long-lived bottom scavengers at a high trophic level, renders their tissue residues an important measurement endpoint for assessing contaminant migration in the food chain. The significance of these findings will be evaluated further during the Phase II investigation (NCCOSC et al., 1994).

Impacts to the ecological zone characterized by the dominance of fucoid algae were assessed by measurements of fucoid biomass and tissue residues. Low fucoid biomass was observed at Stations 8 and 10, while high Cu concentrations in fucoid tissue were measured at Stations 9 and 10A. High lead was measured in one of the replicates from Station 10A (13.3 ppm), although the other replicate from that station was only 0.49 ppm. The elevated tissue level could be an indication that there is a contamination source near where the elevated replicate was collected (i.e., near the storage yard). There appeared to be no correspondence between tissue concentrations and low biomass measurements, suggesting that the causative factors affecting biomass patterns are more related to substrate type and hydrographic regime than to contamination (Section 3.8). It does appear that the algae accumulate more Cu than the other organisms sampled and may therefore be a better indicator of exposure to copper.

Mussel abundance and density patterns were closely related to geomorphology and the current dynamics of the various station locations (Section 3.10). The wide range of habitat types sampled provides a very good population for estimating contaminant distributions. Mussel station locations were selected to be representative of specific geographic and habitat characteristics present throughout the estuary—including rocky outcrops, muddy coves, eelgrass beds, industrial areas, marinas, urbanized areas, and rural areas (Section 3-10). In addition, the mussels are a surrogate for a wide range of filter-feeding, water-column–dwelling marine organisms. The mussel data can be compared to chemical residue distributions from the nationwide Mussel Watch database to identify "high" exposures and delineate possible sources of contamination. Conducting more detailed investigations of mussel residue levels in areas of potentially high chemical exposure, routinely monitoring chemical residue levels, and assessing the impact to mussels (and by implication to other similar marine organisms) will be some of the activities undertaken during Phase II of the estuarine investigation (NCCOSC et al., 1994).

EELGRASS COMMUNITIES

Measurements of eelgrass beds in the estuary indicated that some of the healthiest and most abundant beds were located around Seavey Island. Increased eelgrass biomass was measured in the lower portion of the estuary (Section 3.7). Eelgrass beds were not present inside Clark Cove, even though sediment texture and environmental conditions there may be conducive to eelgrass growth and development. Results obtained from the chemical analysis of tissues indicate that there could be sources of heavy-metal contamination in the sediment or water at particular sites around Seavey Island. It also appears that the eelgrass may be bioaccumulating some heavy metals (Cu, Cr, and Pb). The lack of eelgrass beds in Clark Cove, the relationship between eelgrass morphometrics and health, and chemical exposure, and the implications of the trophic transfer of chemical accumulation in eelgrass tissue will be evaluated further during Phase II.

WATER QUALITY

Measurements of water quality parameters indicated that sewage inputs were prevalent in the lower estuary. Excess levels of NO_3 were consistently measured in the lower estuary. Evidence of sewage input from concentrations of fecal bacterium, *Clostridium perfringens*, were also measured at all stations in the lower estuary, although concentrations were much lower than levels measured in the upper estuary (Section 3.5). Dissolved oxygen remained at high levels both during the synoptic September 1991 survey and the seasonal monitoring periods (Section 3.3).

Current measurements indicated that the lower estuary is a tidally driven, very well mixed system with significant flushing (Section 3.6). The current measurements also showed that the Spruce Creek may form a salt wedge in connection with the Piscataqua River, indicating that there is a significantly different flushing regime in Spruce Creek than in the Piscataqua River.

The analysis of heavy metals in the water column did not meet data quality objectives, because the water methods used were not capable of achieving low enough detection limits for the marine water samples. However, these methods were capable of measuring heavy metals from seep samples because concentrations of Pb, Hg, Cr, Ni, and As were very high (Section 3.13). If the concentrations measured in the seeps are accurate, and not an artifact from sediment particulates in the sample, then seep samples provided a direct measure of pollutant migration from the landfill. Both the water column and seeps from Seavey Island will be resampled with more appropriate analytical methods during Phase II to determine the potential sources of metal inputs, provide a data set for the calibration of the dispersion model, and determine input rates from the seeps (NCCOSC et al., 1994).

Water-column toxicity tests and measurements of deployed mussel physiology were conducted to evaluate stressor effects on water-column organisms. Toxicity to sea urchin fertilization and development was measured at three stations in Clark Cove (Stations 3, 5, and 7; figure 4-2; see Section 3.4), and stress on mussel growth was detected in the mussels deployed upstream at Cutts Cove (Station 15; figure 4-2, see Section 3.11). The sea urchin toxicity observed in Clark Cove may be related to intertidal seepage from Seavey Island, toxicants from other pollution sources in Clark Cove (e.g., pleasure boats), or toxicants transported into Clark Cove by the currents. The high scope for growth measurement at Station 15 (Cutts Cove) was due in part to the small tissue sizes measured in the mussels deployed there (Appendix J). The fact that no indigenous mussels were found at that location (Section 3.10) suggests that

Station 15 had conditions that could be adverse to mussel growth, even though there appeared to be suitable mussel habitat at that location.

SEDIMENT QUALITY

The relationship of the various bottom texture measurements (percent moisture; percent sand, silt, clay, and mud; mean Φ; and percent combustibles (see Appendix A)) was used to evaluate similarities in bottom texture among stations. A multivariate cluster analysis, using an average distance linkage based on principal component analysis and a Euclidian distance metric obtained from the covariance matrix, was used to cluster stations with similar bottom texture characteristics (figure 4-4; SAS, 1989). Clusters with finer sediment material are more depositional in nature and may be associated with a greater level of risk from an accumulation of contaminants.

Although all the stations selected for sediment monitoring are depositional in nature, the stations located in Clark Cove (Stations 4, 5, 6, 7, and 8), around Seavey Island (Stations 10, 13, and 19), a station upstream of the Shipyard at Cutts Cove (Station 15), and a station downstream of the Shipyard (Station 2) have the highest percentage of fine-grained material (muddy sand and mud, greater than 6 Φ; see figure 3-3) and therefore the greatest chance of accumulating contaminants. The results of the cluster analysis indicated that the Clark Cove stations had the finest texture of all stations sampled (figure 4-4) and may, in fact, have the finest bottom material in the lower estuary (L. Ward, UNH JEL, personal communication). The significance of this finding is that Clark Cove has the greatest risk of accumulating contaminants from all sources. Further evaluation of the depositional record at the muddy sand and mud sites is being conducted for Phase II of the estuarine study.

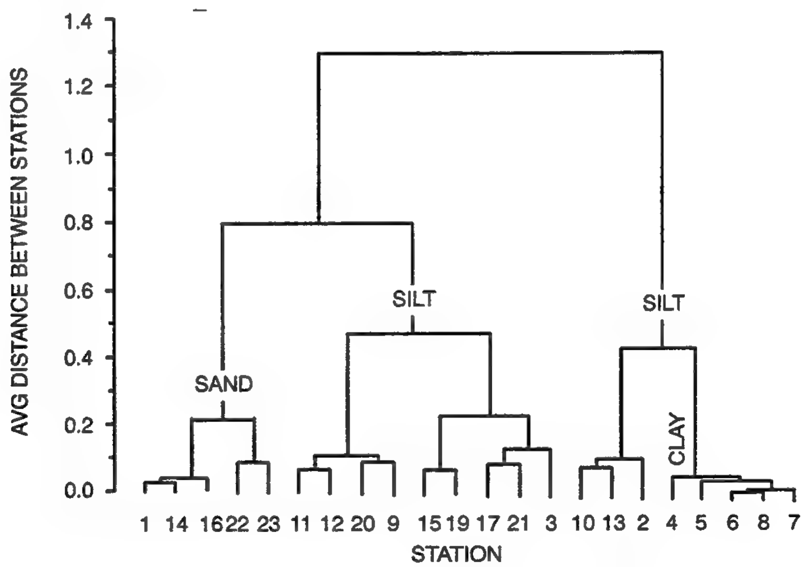

Figure 4-4. Results of cluster analysis of sediment textural measurements.

Stressor impacts, in the form of sediment toxicity to amphipods, were observed at stations around Seavey Island: two of the stations in Clark Cove (Stations 4 and 8), the Back Channel (Stations 19 and 18), near Dry Dock 3 (Station 13), and the Police Dock 9 (Station 9). Although these stations did not have the highest concentrations of sediment contaminants, the results suggest that contaminants may be more biologically available at those stations. Amphipod toxicity was also

detected at the two stations in the York River (figure 4-2; see Section 3.2). The toxicity observed in the samples from the York River may be due to the grain size incompatibility (sandy substrate, Section 3.1), since contamination levels were much lower in samples from the York River than in samples from the Piscataqua River (Sections 3.13 and 3.2).

Indications of sewage input were evident from the high levels of spores of the fecal bacterium *Clostridium perfringens* that were measured in sediments at stations positioned along the southern shore of Seavey Island (Stations 17, 12, 10 and 9; figure 4-2; see Section 3.5). Chemical markers also showed that high levels of sewage indicators occurred at the stations in Portsmouth Harbor, and especially in Clark Cove. Chemical markers from runoff, atmospheric, and petroleum sources were also identified for the stations around Seavey Island (Section 3.14).

GREAT BAY ESTUARY IN A LARGER SETTING

Mussel tissue chemical contaminant burdens analyzed from Portsmouth Harbor were compared to tissue concentrations reported from NOAA's Mussel Watch program (NOAA, 1991a; O'Connor, 1992; figure 4-5). Mussel Watch is a program conducted by NOAA to determine relative pollution levels in coastal areas of the United States. The Mussel Watch data provide information on contamination levels in mussels on a regional scale and were used to evaluate the relative levels of contamination in the mussels collected from Portsmouth Harbor. This comparison gives some idea of the magnitude of the contamination problem in the Great Bay Estuary. For organic contaminants such as PCBs and high molecular weight PAHs, samples from Portsmouth Harbor were among the lowest measured at northeastern sites reported from Mussel Watch data (figure 4-5). However, mussels collected from the Great Bay Estuary had higher concentrations of Pb, Hg, and Cr than Mussel Watch stations (figure 4-6; O'Connor, 1992). This indicates that heavy-metal contamination may pose a greater risk to the ecology of the Great Bay Estuary than organic contamination. It should be noted that the Mussel Watch program specifically excludes sample collection near known pollution sources, and that the resulting data are intended to describe overall regional patterns of contaminant availability. Thus the relatively high levels of metals observed in this study may not represent a grossly contaminated estuarine system.

Compared with median contaminant levels measured in the sediments of Casco Bay, ME (Kennicutt et al., 1991), median concentrations of Pb, Hg, As, Ag, and PCBs were higher and median concentrations of Ni, Cd, Cr, and Cu were lower in the Piscataqua River estuary. Concentrations of PAHs in Portsmouth Harbor appeared to be lower than those measured in Casco Bay, although direct comparisons between PAH levels in the two systems were not possible because different sets of PAH compounds were measured in each. Concentrations of pesticide compounds were fairly similar, although comparisons were hindered by the fact that most of the pesticide compounds measured were below the limit of quantification of the analytical methods (Kennicutt et al., 1991).

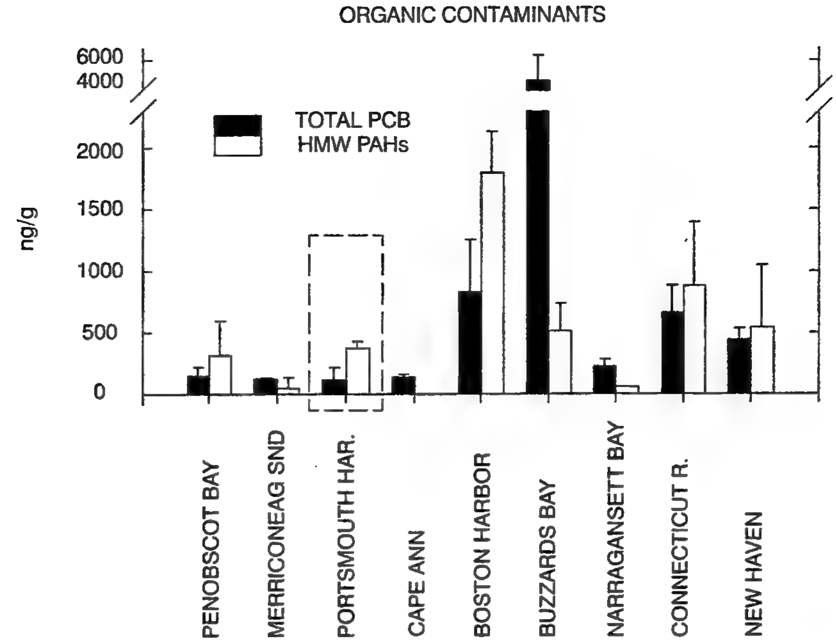

Figure 4-5. Comparison of the sum of high molecular weight (HMW) PAH and Total PCB (calculated from the sum of 18 measured congeners) compounds measured in mussel tissues collected from Portsmouth Harbor (this study) and Mussel Watch (NOAA, 1991a) stations along the Northeast Coast of the United States. Bars show the mean and standard deviation of the mean for each location.

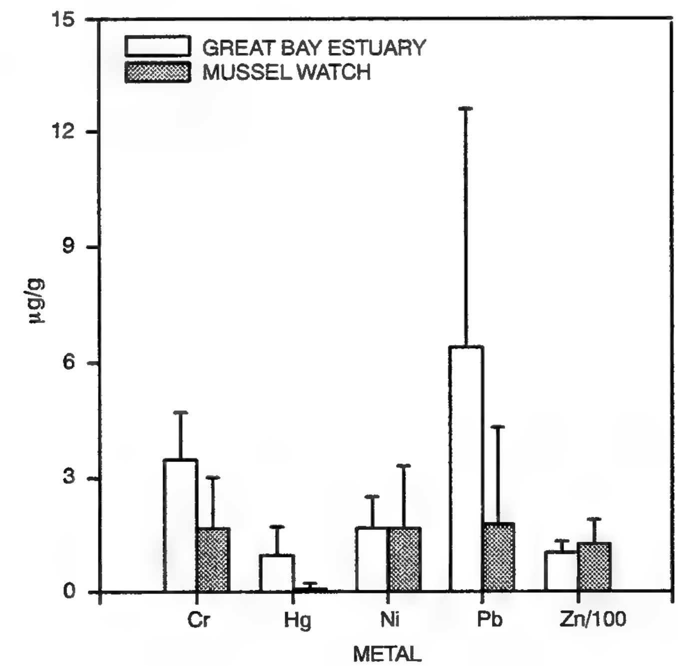

Figure 4-6. Comparison of concentrations of Cr, Hg, Ni, Pb and Zn measured in mussels collected from the Great Bay Estuary (this study) with concentrations measured in mussels from the Mussel Watch program. The data are the geometric mean and standard deviation (O'Connor, 1992).

FISH AND SHELLFISH

Contamination levels measured in lobster and winter flounder tissue were assessed to determine potential impact on these commercially important species. The tissue residues observed (figure 4-7) were below action levels enforced by the FDA to restrict the commercial distribution of seafood (Nauen, 1983). This does not imply that there are no ecological or human health risks associated with observed contaminant levels. There were considerably higher concentrations of lipophilic organic contaminants in the lobster hepatopancreas (tamalley) and the flounder liver tissues than in the flesh tissue of the same organisms, because these contaminants are more easily retained in the fatty tissue of organisms (Pruell et al., 1986). The potential human health risks from the consumption of seafood will be evaluated as part of the human health risk assessment currently being prepared as part of the onshore study (McLaren/Hart Environmental Engineering Corp., 1991; E. Mahoney and Associates, 1993).

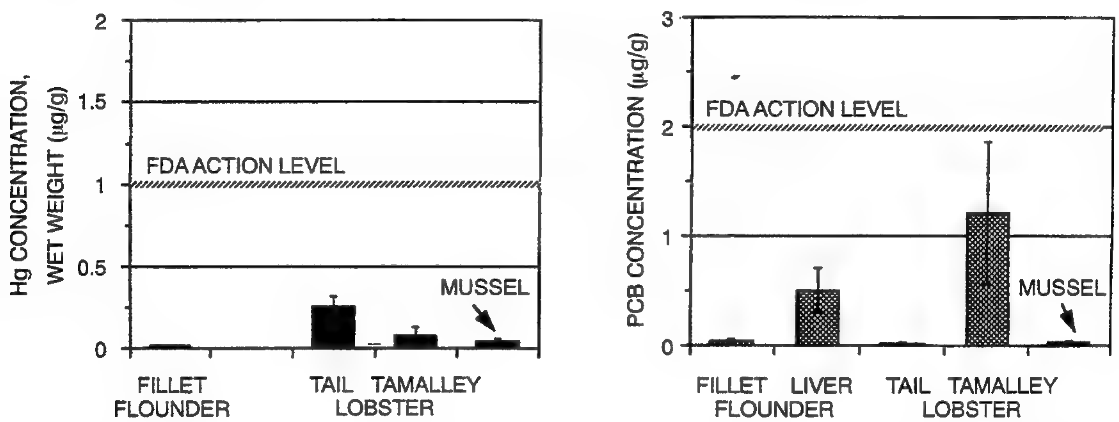

Figure 4-7. Concentrations of Hg and total PCB measured in winter flounder, lobster, and mussel tissues sampled from Portsmouth Harbor. Bars show mean and standard deviation measured in the flounder flesh (fillet) and liver, lobster tail flesh and hepatopancreas (tamalley), and mussel tissue. Concentrations are reported in wet weight.

CONCEPTUAL MODEL REVISITED

The results of the Problem Formulation data-gathering activities described above led to a revision of the initial conceptual model presented in Section 2.0. In its revised form (figures 4-8 and 4-9), the two-tiered conceptual model describes stressor origin, transport, and fate at different spatial and temporal scales: (1) the initial release and transport of contaminants to the estuary, and (2) the longer term transport, fate, and effects of contaminants in the estuary (see Section 2). This model identifies the types of data necessary for the analysis of risk and is subject to modification as new information becomes available as a result of Phase II activities. Provided below is a description of the important revisions to the conceptual model.

Throughout the lower estuary, ecosystems initially identified as potentially at risk included pelagic, benthic, eelgrass, and salt marsh communities. However, Phase I information analyzed to date suggests little indication of broad-scale risk to eelgrass communities, pelagic communities, or to epibenthic, hard-bottom communities. However, the benthic infaunal community, sediment toxicity, and water toxicity data do suggest potential risk in selected depositional areas

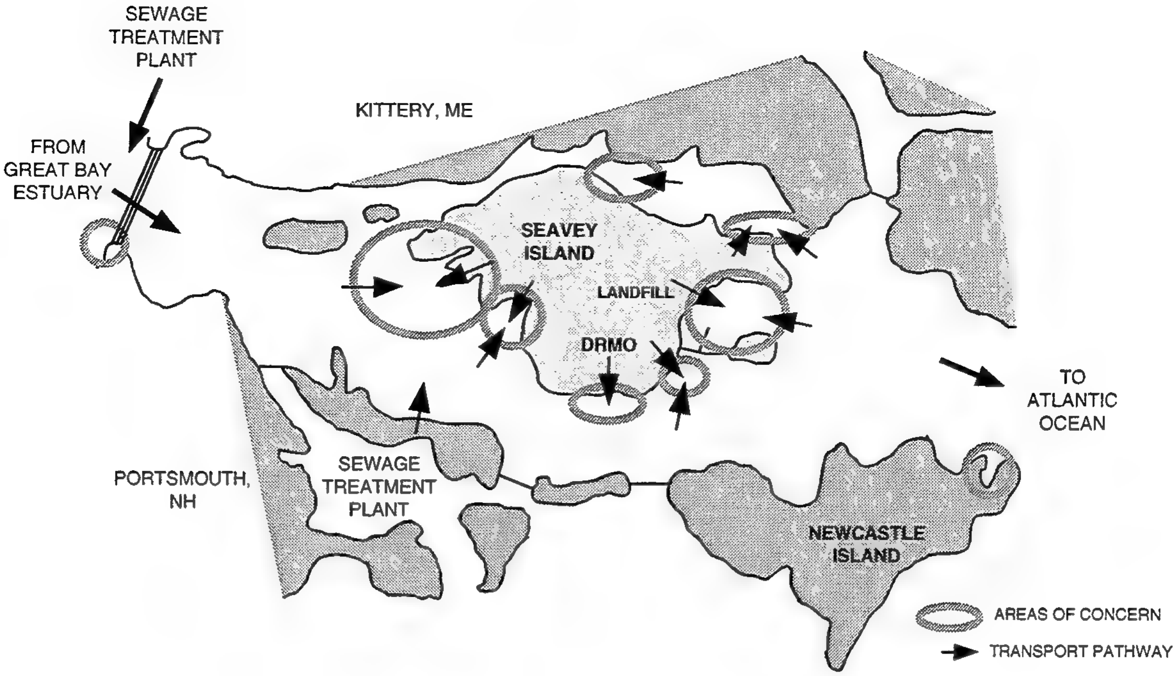

Figure 4-8. Revised first-tier conceptual model; water-column transport of contaminants.

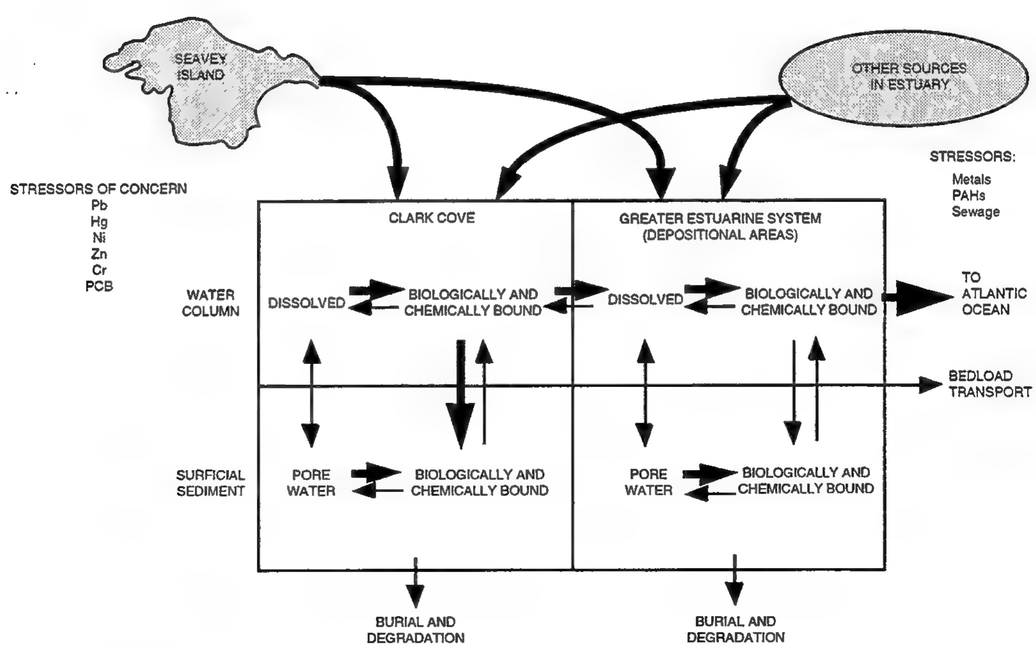

Figure 4-9. Revised second-tier conceptual model; stressor transport, transformation, and fate.

adjacent to the Shipyard, primarily in Clark Cove. Although risks to other ecosystems present in the estuary cannot be dismissed, the Phase I data indicate that primary attention should focus on the assessment of risks to ecosystems associated with depositional sediments near the Shipyard.

These areas of concern, shown in figure 4-8, were identified through the analysis of Phase I information that suggested that (1) depositional areas in the lower estuary (areas around Seavey Island and Clark Cove, and near the Coast Guard Station) accumulate contaminants from the Shipyard as well as from other sources in the estuary; (2) there is an up-estuary source for some metals (primarily Cr and Ni) and some organics (PAHs); and (3) there is significant sewage loading in the lower estuary. Additionally, significant transport of contaminants out of the system may occur as a result of the dynamic hydrographic regime present in the lower estuary. Stressors evident at depositional sites include the metals Pb, Hg, Ni, Zn, and Cr, and perhaps pathogens from past releases of raw sewage from the Shipyard. The relative strengths of sources in the lower estuary, the potential migration of contaminants from the Shipyard into the depositional areas identified around Seavey Island, and the ecological significance of measured contaminant levels will be the focus of Phase II investigations.

At least two important gaps exist with respect to a complete formulation of the conceptual model. The first of these involves an initial assessment of the health of salt marsh communities. Because cordgrass roots trap and anchor fine-grained sediments, salt marshes can function as depositional areas which may accumulate contaminants associated with the Shipyard. Thus an evaluation of potential risks to salt marsh communities is being conducted during Phase II. Additional information is also needed with respect to the trophic transfer of contaminants. The tissue residue data obtained for lobster and mussels indicated elevations in selected chemical contaminants (including Pb and Hg). Tissue residues can be used as an indication of exposure and a measure of the potential trophic transfer of contaminants. However, there are problems associated with interpreting the ecological significance of tissue residues, because of the limited data that directly link tissue residues with ecological effects. Bioaccumulation and trophic transfer will be investigated further in Phase II to evaluate their role in the status of natural resources, and to provide data for evaluating risks to human health associated with seafood consumption.

With the completion of the estuarine study's Problem Formulation, specific assessment activities to be conducted for Analysis and Risk Quantification can be identified and initiated. Detailed descriptions of Phase II efforts are provided in NCCOSC et al. (1994).

CONCLUSION

Indicators of ecological stress appeared to be restricted primarily to depositional areas identified in the lower estuary. The complex stress patterns observed could be an indication that there are a variety of stressor sources in the lower estuary. Chemical contamination levels measured in the Piscataqua River and Great Bay Estuary followed complex patterns (see Section 3.13). Pb, Hg, Zn, Ni, Cr, and, to a lesser degree, PCBs are all contaminants of concern in the estuary. The analysis of tissue residues of organisms collected from the estuary (figure 4-3) indicated an up-estuary source for Cr, Ni, and PAHs. The lower estuary in the vicinity of the Shipyard had indications of Pb and perhaps Hg contamination which in some instances exceed by many times the background concentrations of those elements. In addition, there was some evidence that Hg was biologically available to the biota of the estuary.

Information collected to date indicates limited toxicological impact and the absence of severe environmental contamination, although there is evidence of elevated heavy metal concentrations

in the estuary. The observed contaminant levels indicate chronic exposure and may be early warning indications of long-term impact. Most likely, this contamination originated from a variety of sources which cannot be completely identified at this stage of the study. However, these results can be used to identify and remediate sources of current contaminant migration from the Shipyard. For the materials that have already been released, possible courses of action include (1) undertaking restoration activities, such as enhancing eelgrass beds or supporting the development of marshes and other wetland areas, as a means of contributing to the overall health of the estuary; (2) dredging to remove materials that are significantly impacting the ecology of the estuary; (3) capping or isolating highly contaminated areas from further contact with the ecosystem; (4) amending sediments or shoreline substrates to enhance the natural assimilative and detoxifying capacity of the ecosystem; and (5) taking no action. The monitoring program initiated as part of this study will help to quantify the success and progress of remediation activities by providing a base of information which can be used to determine if conditions in the estuary are getting better, staying the same, or getting worse.

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Appendix A

TEXTURE OF BOTTOM SEDIMENTS

1. SEDIMENT CORE SAMPLES

VARIABLE LIST:

VARIABLE NAME	DESCRIPTION
EPAID	EPA ID (Chain of custody ID number).
REP	Replicate identification. Letter is the one assigned to samples for chemistry. N = not transferred.
CDATE	Collection date expressed as YYMMDD (from CUSTOD database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).
DEPTH	Depth (cm) gives the sample interval.
MOIST	Moisture content (%) of the sample measured as weight loss after drying at ~50°C.
GRAVEL SAND MUD	% GRAVEL , % SAND, %MUD in the sample
SAND SILT CLAY	% SAND, %SILT, %CLAY in the sample.
MEANPHI	Mean grain size in phi units (Folk, 1980).
SORTPHI	Sorting in phi units (Folk, 1980).
SKEWNESS	Skewness of the sample in dimensionless units (Folk, 1980).
KURTOSIS	Kurtosis of the sample in dimensionless units (Folk, 1980).
COMBUST	Combustible content (%) of the sample measured as weight loss after combusting at 450°C. Same as loss on ignition.
GSMCLASS	Classification of sediment sample based on gravel, sand, and mud content (Folk,1980). G=gravelly, S=sandy, and M=muddy.
SSCCLASS	Classification of sediment sample based on sand, silt and clay content (Folk,1980).

GRAINSIZE ANALYSIS ON SEDIMENT CORE SAMPLES

EPAID	REP	CDATE	CTIME	STA	DEPTH	MOIST	GRAVEL	SAND	MUD	SAND	SILT	CLAY	MEANPHI	SORTPHI	SKEWNESS	KURTOSIS	COMBUST	GSMCLASS	SSCCLASS
110015	A	910916	10:40	15	0-8	40	0	56	44	56	27	17	4.920	2.860	0.630	1.460	6	MUDDY SAND	MUDDY SAND
110015	B	910916	10:40	15	30-38	48	0	48	52	48	33	19	5.320	2.940	0.650	1.170	7	SANDY MUD	SANDY MUD
110015	C	910916	10:40	15	60-68	53	0	18	82	18	42	40	7.350	3.430	0.220	0.770	9	SANDY MUD	SANDY MUD
110015	D	910916	10:40	15	100-108	52	0	22	78	22	39	39	7.230	3.470	0.190	0.800	10	SANDY MUD	SANDY MUD
110016	A	910916	11:00	16	0-8	25	0	87	13	87	8	5	3.130	1.290	0.290	2.860	1	MUDDY SAND	MUDDY SAND
110016	B	910916	11:00	16	20-28	27	0	86	14	86	9	5	3.000	1.420	0.440	2.620	1	MUDDY SAND	MUDDY SAND
110016	C	910916	11:00	16	50-58	39	0	27	73	27	41	32	6.080	2.380	0.300	0.600	5	SANDY MUD	SANDY MUD
110016	D	910916	11:00	16	100-108	44	0	26	74	26	43	31	5.960	2.130	0.090	0.580	5	SANDY MUD	SANDY MUD
110017	A	910916	11:30	17	0-8	42	1	51	48	52	31	17	5.050	2.810	0.650	1.480	5	MUDDY SAND	MUDDY SAND
110017	B	910916	11:30	17	30-38	51	4	38	58	42	30	28	5.900	3.610	0.380	0.850	8	SANDY MUD	SANDY MUD
110017	C	910916	11:30	17	70-78	49	0	34	66	34	33	33	6.430	3.570	0.350	0.780	6	SANDY MUD	SANDY MUD
110014	A	910916	12:30	14	0-8	29	0	77	23	77	14	9	3.530	2.550	0.560	2.910	3	MUDDY SAND	MUDDY SAND
110014	B	910916	12:30	14	20-28	40	1	54	45	55	27	18	4.930	2.490	0.580	0.860	4	MUDDY SAND	MUDDY SAND
110014	C	910916	12:30	14	40-48	32	0	36	64	36	38	26	5.590	2.330	0.190	0.600	3	SANDY MUD	SANDY MUD
110019	A	910916	14:00	19	0-8	49	0	28	72	28	45	27	6.230	3.130	0.600	0.900	8	SANDY MUD	SANDY MUD
110019	B	910916	14:00	19	20-28	51	0	29	71	29	43	28	6.290	3.160	0.570	0.000	6	SANDY MUD	SANDY MUD
110019	C	910916	14:00	19	50-58	49	0	34	66	34	34	32	6.100	2.960	0.420	0.730	8	SANDY MUD	SANDY MUD
110004	A	910916	14:30	4	0-10	63	0	6	94	6	52	42	7.770	3.180	0.280	0.720	10	MUD	MUD
110004	B	910916	14:30	4	10-20	61	0	4	96	4	49	47	7.370	2.390	-0.030	0.820	9	MUD	MUD
110002	A	910918	10:00	2	0-8	56	0	17	83	17	48	35	6.980	3.290	0.450	0.760	8	SANDY MUD	SANDY MUD
110002	B	910918	10:00	2	30-38	41	0	36	64	36	47	17	5.270	2.550	0.520	1.280	5	SANDY MUD	SANDY SILT
110002	C	910918	10:00	2	70-78	45	0	32	68	32	43	25	6.200	3.370	0.540	0.980	6	SANDY MUD	SANDY MUD
110003	A	910918	10:30	3	0-8	41	0	59	41	59	28	13	4.430	2.340	0.610	2.340	5	MUDDY MUD	SILTY SAND
110003	B	910918	10:30	3	8-15	46	0	56	44	56	29	15	5.030	2.710	0.730	1.850	5	MUDDY SAND	SILTY SAND
110005	A	910918	11:10	5	0-10	63	0	6	94	6	49	45	7.820	3.080	0.290	0.830	10	MUD	MUD
110005	B	910918	11:10	5	10-20	60	0	11	89	11	48	41	7.630	3.200	0.280	0.860	9	SANDY MUD	SANDY MUD
110005	C	910918	11:10	5	20-30	63	0	9	91	9	50	41	7.570	3.110	0.290	0.780	8	MUD	MUD
110007	A	910918	11:30	7	0-8	64	0	6	94	6	50	44	7.830	3.090	0.240	0.790	10	MUD	MUD
110007	B	910918	11:30	7	25-33	50	5	28	67				4.980	3.170	-0.280	1.040	5	CMS	
110007	C	910918	11:30	7	42-50	23	1	14	85	15	49	36	7.180	3.450	0.170	1.020	1	SANDY MUD	SANDY MUD
110008	A	910918	12:00	8	0-8	59	0	5	95	5	58	37	6.980	2.330	0.110	0.960	9	MUD	MUD
110008	B	910918	12:00	8	16-24	58	1	10	89	11	52	37	6.780	2.360	-0.140	1.090	12	SANDY MUD	SANDY MUD
110006	A	910918	12:30	6	0-7	59	0	6	94	6	60	34	7.070	2.620	0.270	0.980	6	MUD	SILT
110006	B	910918	12:30	6	20-27	23	0	5	95	5	54	41	7.700	3.030	0.260	0.820	1	MUD	MUD
110001	A	910919	09:45	1	0-10	27	0	82	18	82	11	7	3.480	1.380	0.610	4.550	2	MUDDY SAND	MUDDY SAND
110001	B	910919	09:45	1	10-20	29	0	80	20	80	13	7	3.600	1.460	0.570	3.590	2	MUDDY SAND	MUDDY SAND

(Contd)

EPAID	REP	CDATE	CTIME	STA	DEPTH	MOIST	GRAVEL	SAND	MUD	SAND	SILT	CLAY	MEANPHI	SORTPHI	SKEWNESS	KURTOSIS	COMBUST	GSMCLASS	SSCCLASS
110010	A	910926	10:00	10	0-8	50	1	38	61	39	56	5	4.240	2.790	-0.300	0.930	6	SANDY MUD	SANDY SILT
110010	B	910926	10:00	10	30-38	52	3	29	68	32	56	12	4.950	3.040	-0.320	1.180	7	SANDY MUD	SANDY SILT
110010	C	910926	10:00	10	60-68	53	2	41	57	43	52	5	3.920	3.060	-0.370	0.640	6	SANDY MUD	SANDY SILT
110010	D	910926	10:00	10	90-98	53	1	30	69	31	52	17	5.530	2.910	-0.130	1.080	6	SANDY MUD	SANDY SILT
110010	E	910926	10:00	10	132-138	42	7	39	54				4.520	4.260	-0.040	0.760	7	G MUD	
110011	A	910926	10:45	11	0-8	34	0	65	35	65	20	15	4.520	2.600	0.800	1.450	5	MUDDY SAND	MUDDY SAND
110011	B	910926	10:45	11	20-28	25	9	61	30				3.530	2.420	0.100	4.370	2	GM SAND	
110011	C	910926	10:45	11	50-58	26	0	53	47	53	43	4	4.430	1.530	0.540	1.320	0	MUDDY SAND	CLAYEY SAND
110012	A	910926	11:00	12	0-8	36	0	69	31	69	23	8	4.320	2.150	0.620	1.430	3	MUDDY SAND	CLAYEY SAND
110012	B	910926	11:00	12	10-18	37	1	63	36	64	22	14	4.430	2.440	0.560	1.240	3	MUDDY SAND	MUDDY SAND
110012	C	910926	11:00	12	20-28	46	0	39	61	39	34	27	5.580	3.040	0.330	0.800	7	SANDY MUD	SANDY MUD
110013	A	910926	12:15	13	0-8	40	1	59	40	60	34	6	4.480	2.030	0.560	0.970	4	MUDDY SAND	SILTY SAND
110013	B	910926	12:15	13	20-28	45	1	53	46	54	39	7	4.430	2.190	0.390	0.810	4	MUDDY SAND	SILTY SAND
110013	C	910926	12:15	13	40-48	21	0	1	99	1	52	47	7.520	1.870	-0.080	0.820	1	MUD	MUD
110020	A	911115	10:30	20	0-8	35	1	54	45	55	28	17	5.080	2.930	0.680	1.370	4	MUDDY SAND	MUDDY SAND
110020	B	911115	10:30	20	20-28	33	1	49	50	50	30	20	5.320	3.040	0.630	1.130	3	MUDDY SAND	MUDDY SAND
110020	C	911115	10:30	20	50-58	25	0	44	56	44	42	14	4.880	1.860	0.650	2.130	3	SANDY MUD	SANDY CLAY
110021	A	911115	11:00	21	0-8	41	0	47	53	47	31	22	5.660	3.080	0.710	1.000	5	SANDY MUD	SANDY MUD
110021	B	911115	11:00	21	20-28	36	0	44	56	44	36	20	5.460	2.300	0.660	0.920	5	SANDY MUD	SANDY SILT
110021	C	911115	11:00	21	50-58	39	0	29	71	29	44	27	5.890	2.210	0.340	0.570	4	SANDY MUD	SANDY MUD
110021	D	911115	11:00	21	85-92	35	0	45	55	45	51	4	4.980	1.710	0.550	0.900	4	SANDY MUD	SANDY CLAY
110010	N			10	28-33	45	5	67	28				2.520	2.360	-0.040	0.680	3	CM	
110010	N			10	130-132	37	13	52	35				2.000	3.060	0.370	0.680	10	GM SAND	

2. SEDIMENT GRAB SAMPLE

VARIABLE LIST:

VARIABLE NAME	DESCRIPTION
EPAID	EPA ID (Chain of custody ID number).
REP	Replicate identification. Letter is the one assigned to samples for chemistry. N = not transferred.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).
MOIST	Moisture content (%) of the sample measured as weight loss after drying at ~50°C.
GRAVEL SAND MUD	% GRAVEL, % SAND, %MUD in the sample.
SAND SILT CLAY	% SAND, %SILT, %CLAY in the sample.
MEANPHI	Mean grain size in phi units (Folk, 1980).
SORTPHI	Sorting in phi units (Folk, 1980).
SKEWNESS	Skewness of the sample in dimensionless units (Folk, 1980).
KURTOSIS	Kurtosis of the sample in dimensionless units (Folk, 1980).
COMBUST	Combustible content (%) of the sample measured as weight loss after combusting at 450°C. Same as loss on ignition.
GSMCLASS	Classification of sediment sample based on gravel, sand, and mud content (Folk,1980). G=gravelly, S=sandy, and M=muddy
SSCCLASS	Classification of sediment sample based on sand, silt and clay content (Folk,1980).

NOTE: DEPTH not shown. For all sediment grab samples, depth equals surface (surface grab of roughly 4–10 cm).

GRAINSIZE ANALYSIS ON SEDIMENT GRAB SAMPLES

EPAID	REP	CDATE	CTIME	STA	NAINUM	MOIST	GRAVEL	SAND	MUD	SAND	SILT	CLAY	MEANPHI	SORTPHI	SKEWNESS	KURTOSIS	COMBUST	GSMCLASS	SSCCLASS
110221	1	910916	12:15	1	126733	32	0	85	15	85	10	5	3.33	1.28	0.56	5.33	2	MUDDY SAND	MUDDY SAND
110221	2	910916	12:15	1	126736	31	0	85	15	85	9	6	3.37	1.16	0.47	4.92	2	MUDDY SAND	MUDDY SAND
110221	3	910916	12:15	1	126738	37	0	87	13	87	8	5	3.23	1.09	0.40	3.69	2	MUDDY SAND	MUDDY SAND
110221	4	910916	12:15	1	126740	27	0	87	13	87	8	5	3.33	1.28	0.42	5.41	2	MUDDY SAND	MUDDY SAND
110230	1	910916	11:20	2	126859	61	0	25	75	25	46	29	6.60	3.22	0.53	0.80	7	SANDY MUD	SANDY MUD
110230	2	910916	11:20	2	126862	63	0	23	77	23	46	31	6.63	3.23	0.43	0.80	7	SANDY MUD	SANDY MUD
110230	3	910916	11:20	2	126864	56	0	33	67	33	41	26	6.10	3.16	0.61	0.89	6	SANDY MUD	SANDY MUD
110230	4	910916	11:20	2	126866	61	0	27	73	27	46	27	6.33	3.14	0.57	0.86	7	SANDY MUD	SANDY MUD
110231	1	910916	14:05	3	126873	51	0	48	52	48	34	18	5.50	2.86	0.68	1.39	5	SANDY MUD	SANDY MUD
110231	2	910916	14:05	3	126876	52	0	47	53	47	37	16	5.23	2.76	0.62	1.50	5	SANDY MUD	SANDY SILT
110231	3	910916	14:05	3	126878	49	0	55	45	55	29	16	4.90	2.77	0.62	1.71	4	MUDDY SAND	MUDDY SAND
110231	4	910916	14:05	3	126880	54	0	41	59	41	41	18	5.30	2.74	0.63	1.39	6	SANDY MUD	SANDY SILT
110222	1	910911	16:55	4	126747	66	0	7	93	7	51	42	7.77	3.10	0.33	0.73	8	MUD	MUD
110222	2	910911	16:55	4	126750	71	0	6	94	6	51	43	7.97	3.14	0.27	0.73	8	MUD	MUD
110222	3	910911	16:55	4	126752	67	0	9	91	9	42	49	8.40	3.17	0.13	0.73	9	MUD	MUD
110222	4	910911	16:55	4	126754	68	0	7	93	7	46	47	8.10	3.12	0.16	0.79	8	MUD	MUD
110232	1	910912	10:05	5	128883	71	0	12	88	12	45	43	7.83	3.27	0.23	0.76	8	SANDY MUD	SANDY MUD
110232	2	910912	10:05	5	128886	68	0	8	92	8	51	41	7.70	3.18	0.30	0.71	9	MUD	MUD
110232	3	910912	10:05	5	128888	70	0	8	92	8	51	41	7.67	3.18	0.33	0.72	9	MUD	MUD
110232	4	910912	10:05	5	128890	69	0	7	93	7	51	42	7.73	3.17	0.31	0.73	9	MUD	MUD
110224	1	910912	13:15	6	126775	67	0	6	94	6	52	42	7.90	3.11	0.26	0.78	8	MUD	MUD
110224	2	910912	13:15	6	126778	67	0	7	93	7	54	39	7.63	3.14	0.40	0.74	8	MUD	MUD
110224	3	910912	13:15	6	126780	67	0	5	95	5	49	46	8.23	3.06	0.22	0.74	8	MUD	MUD
110224	4	910912	13:15	6	126782	68	0	6	94	6	53	41	7.80	3.12	0.30	0.74	8	MUD	MUD
110226	1	910912	15:05	7	126803	66	0	7	93	7	50	43	7.83	3.22	0.29	0.71	9	MUD	MUD
110226	2	910912	15:05	7	126806	70	0	7	93	7	49	44	7.93	3.16	0.23	0.73	9	MUD	MUD
110226	3	910912	15:05	7	126808	69	0	7	93	7	51	42	7.87	3.09	0.29	0.74	9	MUD	MUD
110226	4	910912	15:05	7	126810	67	0	7	93	7	51	42	7.77	3.12	0.33	6.00	9	MUD	MUD
110225	1	910912	14:05	8	126789	62	0	7	93	7	52	41	7.73	3.13	0.35	0.76	9	MUD	MUD
110225	2	910912	14:05	8	126792	64	0	6	94	6	50	44	7.93	3.08	0.27	0.79	9	MUD	MUD
110225	3	910912	14:05	8	126794	64	0	6	94	6	53	41	7.77	3.09	0.30	0.75	9	MUD	MUD
110225	4	910912	14:05	8	126796	62	0	8	92	8	53	39	7.50	3.06	0.37	0.81	9	MUD	MUD
110229	1	910916	10:05	9	126845	47	8	52	40				4.50	3.95	0.40	1.30	4	GM SAND	
110229	2	910916	10:05	9	126848	50	0	58	42	58	22	20	4.83	3.89	0.48	1.29	5	MUDDY SAND	MUDDY SAND
110229	3	910916	10:05	9	126850	38	0	69	31	69	17	14	4.00	3.23	0.53	1.74	4	MUDDY SAND	MUDDY SAND
110229	4	910916	10:05	9	126852	34	0	72	28	72	15	13	3.80	3.20	0.48	2.27	4	MUDDY SAND	MUDDY SAND
110220	1	910911	13:45	10	126719	60	0	29	71	29	37	34	6.73	3.52	0.34	0.78	8	SANDY MUD	SANDY MUD

(Contd)

EPAID	REP	CDATE	CTIME	STA	NAINUM	MOIST	GRAVEL	SAND	MUD	SAND	SILT	CLAY	MEANPHI	SORTPHI	SKEWNESS	KURTOSIS	COMBUST	GSMCLASS	SSCCLASS
110220	2	910911	13:45	10	126722	53	0	31	69	31	38	31	6.47	3.40	0.48	0.77	7	SANDY MUD	SANDY MUD
110220	3	910911	13:45	10	126724	60	0	25	75	25	38	37	7.00	3.53	0.26	0.76	8	SANDY MUD	SANDY MUD
110220	4	910911	13:45	10	126726	57	0	26	74	26	39	35	6.83	3.48	0.32	0.79	7	SANDY MUD	SANDY MUD
110216	1	910910	14:15	11	132120	43	0	66	34	66	20	14	4.37	2.62	0.72	1.81	5	MUDDY SAND	MUDDY SAND
110216	2	910910	14:15	11	132123	39	17	54	29				2.40	4.44	-0.04	2.81	4	GM SAND	
110216	3	910910	14:15	11	132125	32	0	75	25	75	15	10	3.70	2.03	0.65	2.37	3	MUDDY SAND	MUDDY SAND
110216	4	910910	14:15	11	132127	35	0	68	32	68	19	13	4.13	2.32	0.74	2.22	4	MUDDY SAND	MUDDY SAND
110218	1	910911	10:55	12	126699	31	0	73	27	73	17	10	3.80	2.29	0.59	2.29	3	MUDDY SAND	MUDDY SAND
110218	2	910911	10:55	12	126702	27	0	75	25	75	15	10	3.77	2.26	0.65	2.72	3	MUDDY SAND	MUDDY SAND
110218	3	910911	10:55	12	126704	35	0	66	34	66	20	14	4.43	2.67	0.72	1.99	4	MUDDY SAND	MUDDY SAND
110218	4	910911	10:55	12	126706	33	0	64	36	64	22	14	4.40	2.77	0.65	1.86	4	MUDDY SAND	MUDDY SAND
110219	1	910911	12:30	13	126709	65	0	32	68	32	38	30	6.27	3.27	0.45	0.84	9	SANDY MUD	SANDY MUD
110219	2	910911	12:30	13	126712	68	0	16	84	16	44	40	7.43	3.27	0.24	0.80	13	SANDY MUD	SANDY MUD
110219	3	910911	12:30	13	126714	77	0	13	87	13	44	43	7.60	3.18	0.17	0.82	11	SANDY MUD	SANDY MUD
110219	4	910911	12:30	13	126716	49	0	36	64	36	38	26	6.30	3.13	0.38	0.70	6	SANDY MUD	SANDY MUD
110214	1	910910	12:45	14	117502	27	0	81	19	81	12	7	3.20	1.97	0.38	3.85	2	MUDDY SAND	MUDDY SAND
110214	2	910910	12:45	14	117505	28	0	80	20	80	12	8	3.30	2.05	0.34	3.69	2	MUDDY SAND	MUDDY SAND
110214	3	910910	12:45	14	117507	27	0	86	14	86	9	5	3.10	1.31	0.41	2.82	2	MUDDY SAND	MUDDY SAND
110214	4	910910	12:45	14	117509	25	0	93	7	93	5	2	2.80	0.74	0.16	1.49	1	MUDDY SAND	MUDDY SAND
110215	1	910910	11:35	15	117512	54	0	41	59	41	35	24	5.63	3.12	0.51	0.97	6	SANDY MUD	SANDY MUD
110215	2	910910	11:35	15	117515	52	0	41	59	41	34	25	5.93	3.32	0.61	0.93	6	SANDY MUD	SANDY MUD
110215	3	910910	11:35	15	117517	45	0	42	58	42	35	23	5.55	3.05	0.58	1.00	6	SANDY MUD	SANDY MUD
110215	4	910910	11:35	15	117519	45	0	40	60	40	35	25	5.80	3.18	0.56	0.90	6	SANDY MUD	SANDY MUD
110212	1	910910	10:30	16	117453	26	0	86	14	86	8	6	3.10	1.41	0.44	3.10	2	MUDDY SAND	MUDDY SAND
110212	2	910910	10:30	16	117457	26	0	73	27	73	16	11	3.77	2.19	0.71	2.23	2	MUDDY SAND	MUDDY SAND
110212	3	910910	10:30	16	117460	23	0	91	9	91	6	3	2.87	0.82	0.32	1.55	1	SAND	SAND
110212	4	910910	10:30	16	117463	24	0	85	15	85	11	4	3.13	1.12	0.47	2.32	2	MUDDY SAND	SILTY SAND
110217	1	910910	15:25	17	132130	40	0	53	47	53	30	17	5.03	2.88	0.64	1.30	4	MUDDY SAND	MUDDY SAND
110217	2	910910	15:25	17	132133	38	0	57	43	57	27	16	4.80	2.84	0.65	1.58	4	MUDDY SAND	MUDDY SAND
110217	3	910910	15:25	17	132135	44	0	46	54	46	32	22	5.50	3.18	0.57	0.99	5	SANDY MUD	SANDY MUD
110217	4	910910	15:25	17	132137	45	0	47	53	47	30	23	5.60	3.25	0.63	0.95	4	SANDY MUD	SANDY MUD
110211	1	910909	16:05	18	117439	41	15	48	37				3.17	4.11	0.23	0.99	6	GM SAND	
110211	2	910909	16:05	18	117442	18	41	51	8				-0.40	2.40	0.31	1.35	2	MSG	
110211	3	910909	16:05	18	117445	40	26	53	21				1.00	4.61	0.02	1.36	10	GM SAND	
110211	4	910909	16:05	18	117448	30	27	41	32				2.23	4.23	0.07	0.81	4	GM SAND	
110210	1	910909	14:09	19	117422	57	0	33	67	33	45	22	6.00	3.13	0.60	1.04	7	SANDY MUD	SANDY MUD
110210	2	910909	14:09	19	117428	59	0	35	65	35	42	23	6.00	3.14	0.60	0.95	7	SANDY MUD	SANDY MUD
110210	3	910909	14:09	19	117431	46	0	49	51	49	34	17	5.20	2.79	0.64	1.59	5	SANDY MUD	SANDY MUD
110210	4	910909	14:09	19	117435	42	0	50	50	50	33	17	5.10	2.37	0.62	1.09	5	SANDY MUD	SANDY MUD

(Contd)

EPAID	REP	CDATE	CTIME	STA	NAINUM	MOIST	GRAVEL	SAND	MUD	SAND	SILT	CLAY	MEANPHI	SORTPHI	SKEWNESS	KURTOSIS	COMBUST	GSMCLASS	SSCCLASS
110223	1	910912	09:55	20	126761	28	8	64	28				3.67	2.76	0.21	3.28	2	GM SAND	
110223	2	910912	09:55	20	126764	32	0	60	40	60	26	14	4.83	2.69	0.67	1.50	3	MUDDY SAND	MUDDY SAND
110223	3	910912	09:55	20	126766	32	0	70	30	70	20	10	3.83	2.01	0.57	2.32	3	MUDDY SAND	MUDDY SAND
110223	4	910912	09:55	20	126768	35	0	63	37	63	25	12	4.30	3.06	0.38	2.29	3	MUDDY SAND	MUDDY SAND
110213	1	910910	08:30	21	117467	39	0	58	42	58	30	12	4.63	2.31	0.67	1.37	4	MUDDY SAND	SILTY SAND
110213	2	910910	08:30	21	117471	40	0	52	48	52	29	19	5.30	2.99	0.76	1.10	4	MUDDY SAND	MUDDY SAND
110213	3	910910	08:30	21	117474	39	0	56	44	56	27	17	5.07	2.85	0.79	1.41	4	MUDDY SAND	MUDDY SAND
110213	4	910910	08:30	21	117477	42	0	53	47	53	28	19	5.30	2.93	0.73	1.26	4	MUDDY SAND	MUDDY SAND
110228	1	910913	13:50	22	126831	38	0	94	6	94	4	2	2.43	1.17	-0.34	2.87	2	SAND	SAND
110228	2	910913	13:50	22	126834	24	0	94	6	94	3	3	2.63	0.80	0.05	2.25	1	SAND	SAND
110228	3	910913	13:50	22	126836	23	7	86	7				2.53	1.59	-0.32	4.68	1	G SAND	
110228	4	910913	13:50	22	126838	32	10	85	5				2.13	1.76	-0.47	3.48	1	G SAND	
110227	1	910913	12:35	23	126817	22	0	92	8	92	5	3	2.90	0.75	0.56	5.19	1	SAND	SAND
110227	2	910913	12:35	23	126820	28	0	98	2	98	1	1	2.77	0.29	-0.05	1.50	1	SAND	SAND
110227	3	910913	12:35	23	126822	24	0	98	2	98	1	1	2.63	0.31	0.27	1.64	1	SAND	SAND
110227	4	910913	12:35	23	126824	27	0	93	7	93	4	3	2.73	0.59	0.44	4.23	1	SAND	SAND

Appendix B
SEDIMENT TOXICITY

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
DUP	Duplicate sample identification within a replicate.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).
EXPNUM	SAIC, Environmental Testing Center experiment number.
SAMPID	SAIC, Environmental Testing Center sample description, also corresponds to UNHID from the CUSTODY database.
ANIM	Number of animals in duplicate jar.
LIVE	Number of animals alive at end of assay.
PCTSURV	Percent survival.

Ampelisca abdita AMPHIPOD TOXICITY TEST

EPAID	REP	DUP	CDATE	CTIME	STA	EXPNUM	SAMPID	ANIM	LIVE	PCTSURV
112001	A	1				911015	CONTROL	20	16	80.0
112001	A	2				911015	CONTROL	20	20	100.0
112001	A	3				911015	CONTROL	20	18	90.0
112001	A	4				911015	CONTROL	21	20	95.2
112001	A	5				911015	CONTROL	20	19	95.0
112002	A	1				911013	CONTROL	20	20	100.0
112002	A	2				911013	CONTROL	20	19	95.0
112002	A	3				911013	CONTROL	20	20	100.0
112002	A	4				911013	CONTROL	20	19	95.0
112002	A	5				911013	CONTROL	20	20	100.0
112003	A	1				911013	CONTROL	21	21	100.0
112003	A	2				911013	CONTROL	20	19	95.0
112003	A	3				911013	CONTROL	20	19	95.0
112003	A	4				911013	CONTROL	20	19	95.0
112003	A	5				911013	CONTROL	20	18	90.0
110210	A	1	910909	14:09	19	911013	117425	20	19	95.0
110210	A	2	910909	14:09	19	911013	117425	20	17	85.0
110210	A	3	910909	14:09	19	911013	117425	20	19	95.0
110210	A	4	910909	14:09	19	911013	117425	20	19	95.0
110210	A	5	910909	14:09	19	911013	117425	20	18	90.0
110211	A	1	910909	16:05	18	911013	117440	20	1	5.0
110211	A	2	910909	16:05	18	911013	117440	20	3	15.0
110211	A	3	910909	16:05	18	911013	117440	20	0	0.0
110211	A	4	910909	16:05	18	911013	117440	19	5	26.3
110211	A	5	910909	16:05	18	911013	117440	20	0	0.0
110213	A	1	910910	08:30	21	911013	117468	20	20	100.0
110213	A	2	910910	08:30	21	911013	117468	21	20	95.2
110213	A	3	910910	08:30	21	911013	117468	20	20	100.0
110213	A	4	910910	08:30	21	911013	117468	20	18	90.0
110213	A	5	910910	08:30	21	911013	117468	20	19	95.0
110212	A	1	910910	10:30	16	911013	117454	20	16	80.0
110212	A	2	910910	10:30	16	911013	117454	20	17	85.0
110212	A	3	910910	10:30	16	911013	117454	20	16	80.0
110212	A	4	910910	10:30	16	911013	117454	20	18	90.0
110212	A	5	910910	10:30	16	911013	117454	20	18	90.0
110215	A	1	910910	11:35	15	911013	117513	20	19	95.0
110215	A	2	910910	11:35	15	911013	117513	20	15	75.0
110215	A	3	910910	11:35	15	911013	117513	20	19	95.0
110215	A	4	910910	11:35	15	911013	117513	20	17	85.0
110215	A	5	910910	11:35	15	911013	117513	20	20	100.0
110214	A	1	910910	12:45	14	911013	117503	20	17	85.0
110214	A	2	910910	12:45	14	911013	117503	20	17	85.0
110214	A	3	910910	12:45	14	911013	117503	20	19	95.0
110214	A	4	910910	12:45	14	911013	117503	20	19	95.0
110214	A	5	910910	12:45	14	911013	117503	20	19	95.0
110216	A	1	910910	14:15	11	911013	132121	21	21	100.0
110216	A	2	910910	14:15	11	911013	132121	20	18	90.0
110216	A	3	910910	14:15	11	911013	132121	20	19	95.0
110216	A	4	910910	14:15	11	911013	132121	20	18	90.0
110216	A	5	910910	14:15	11	911013	132121	20	17	85.0
110217	A	1	910910	15:25	17	911013	132131	20	17	85.0
110217	A	2	910910	15:25	17	911013	132131	20	18	90.0
110217	A	3	910910	15:25	17	911013	132131	20	16	80.0

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	EXPNUM	SAMPID	ANIM	LIVE	PCTSURV
110217	A	4	910910	15:25	17	911013	132131	20	18	90.0
110217	A	5	910910	15:25	17	911013	132131	20	19	95.0
110218	A	1	910911	10:55	12	911013	126700	20	19	95.0
110218	A	2	910911	10:55	12	911013	126700	20	15	75.0
110218	A	3	910911	10:55	12	911013	126700	20	19	95.0
110218	A	4	910911	10:55	12	911013	126700	20	18	90.0
110218	A	5	910911	10:55	12	911013	126700	20	20	100.0
110219	A	1	910911	12:30	13	911015	126710	20	0	0.0
110219	A	2	910911	12:30	13	911015	126710	20	13	65.0
110219	A	3	910911	12:30	13	911015	126710	20	4	20.0
110219	A	4	910911	12:30	13	911015	126710	20	9	45.0
110219	A	5	910911	12:30	13	911015	126710	20	12	60.0
110220	A	1	910911	13:45	10	911013	126720	20	14	70.0
110220	A	2	910911	13:45	10	911013	126720	20	18	90.0
110220	A	3	910911	13:45	10	911013	126720	20	18	90.0
110220	A	4	910911	13:45	10	911013	126720	20	19	95.0
110220	A	5	910911	13:45	10	911013	126720	20	19	95.0
110222	A	1	910911	16:55	4	911013	126748	20	15	75.0
110222	A	2	910911	16:55	4	911013	126748	20	18	90.0
110222	A	3	910911	16:55	4	911013	126748	20	20	100.0
110222	A	4	910911	16:55	4	911013	126748	20	16	80.0
110222	A	5	910911	16:55	4	911013	126748	20	19	95.0
110223	A	1	910912	09:55	20	911015	126762	22	22	100.0
110223	A	2	910912	09:55	20	911015	126762	20	19	95.0
110223	A	3	910912	09:55	20	911015	126762	20	19	95.0
110223	A	4	910912	09:55	20	911015	126762	20	20	100.0
110223	A	5	910912	09:55	20	911015	126762	20	19	95.0
110232	A	1	910912	10:05	5	911015	128884	20	18	90.0
110232	A	2	910912	10:05	5	911015	128884	20	18	90.0
110232	A	3	910912	10:05	5	911015	128884	20	19	95.0
110232	A	4	910912	10:05	5	911015	128884	20	18	90.0
110232	A	5	910912	10:05	5	911015	128884	20	18	90.0
110224	A	1	910912	13:15	6	911015	126776	20	18	90.0
110224	A	2	910912	13:15	6	911015	126776	20	20	100.0
110224	A	3	910912	13:15	6	911015	126776	20	18	90.0
110224	A	4	910912	13:15	6	911015	126776	20	20	100.0
110224	A	5	910912	13:15	6	911015	126776	20	19	95.0
110225	A	1	910912	14:05	8	911015	126790	20	19	95.0
110225	A	2	910912	14:05	8	911015	126790	20	18	90.0
110225	A	3	910912	14:05	8	911015	126790	20	19	95.0
110225	A	4	910912	14:05	8	911015	126790	20	18	90.0
110225	A	5	910912	14:05	8	911015	126790	20	18	90.0
110226	A	1	910912	15:05	7	911015	126804	20	20	100.0
110226	A	2	910912	15:05	7	911015	126804	20	19	95.0
110226	A	3	910912	15:05	7	911015	126804	20	19	95.0
110226	A	4	910912	15:05	7	911015	126804	20	19	95.0
110226	A	5	910912	15:05	7	911015	126804	20	19	95.0
110227	A	1	910913	12:35	23	911015	126818	20	15	75.0
110227	A	2	910913	12:35	23	911015	126818	20	4	20.0
110227	A	3	910913	12:35	23	911015	126818	20	8	40.0
110227	A	4	910913	12:35	23	911015	126818	20	8	40.0
110227	A	5	910913	12:35	23	911015	126818	20	10	50.0
110228	A	1	910913	13:50	22	911015	126832	20	15	75.0
110228	A	2	910913	13:50	22	911015	126832	20	5	25.0
110228	A	3	910913	13:50	22	911015	126832	20	12	60.0

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EPAID	REP	DUP	CDATE	CTIME	STA	EXPNUM	SAMPID	ANIM	LIVE	PCTSURV
110228	A	4	910913	13:50	22	911015	126832	20	15	75.0
110228	A	5	910913	13:50	22	911015	126832	20	18	90.0
110229	A	1	910916	10:05	9	911015	126846	20	2	10.0
110229	A	2	910916	10:05	9	911015	126846	20	3	15.0
110229	A	3	910916	10:05	9	911015	126846	20	0	0.0
110229	A	4	910916	10:05	9	911015	126846	20	0	0.0
110229	A	5	910916	10:05	9	911015	126846	20	0	0.0
110230	A	1	910916	11:20	2	911015	126860	20	17	85.0
110230	A	2	910916	11:20	2	911015	126860	20	19	95.0
110230	A	3	910916	11:20	2	911015	126860	20	15	75.0
110230	A	4	910916	11:20	2	911015	126860	20	19	95.0
110230	A	5	910916	11:20	2	911015	126860	20	17	85.0
110221	A	1	910916	12:15	1	911015	126734	20	18	90.0
110221	A	2	910916	12:15	1	911015	126734	20	20	100.0
110221	A	3	910916	12:15	1	911015	126734	20	20	100.0
110221	A	4	910916	12:15	1	911015	126734	20	19	95.0
110221	A	5	910916	12:15	1	911015	126734	20	19	95.0
110231	A	1	910916	14:05	3	911015	126874	20	18	90.0
110231	A	2	910916	14:05	3	911015	126874	20	17	85.0
110231	A	3	910916	14:05	3	911015	126874	20	19	95.0
110231	A	4	910916	14:05	3	911015	126874	20	19	95.0
110231	A	5	910916	14:05	3	911015	126874	20	18	90.0

Appendix C
CHARACTERIZATION OF WATER-COLUMN CONDITIONS

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
SUBREP	Replicate identification.
DATE	Collection date expressed as YYMMDD.
TIME	Time of the test.
STA	University of New Hampshire station identifier.
TEMP	Temperature (°C).
SAL	Salinity (PPT).
DEPTH	Depth (m).
TIDE	Hours after low tide
DO	Dissolved oxygen (mg/l).
CHLA	Chlorophyll A (mg/m^3).
PHAEO	Phaeophytyn (mg/m^3).
NH_4	Ammonium (µm).
NO_3	Nitrate (µm).
PO_4	Phosphate (µm).
TSS	Total Suspended Solids (mg/l).
% ORG	Percent Organics (%).
pH	pH.

H2O CHEM

EPAID	SUBREP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	DO	CHLA	PHAEO	NH4	NO3	PO4	TSS	% ORG	pH
110100	1	910913	1024	22	15.9	32.0	1	1.00	7.53	0.802	2.005	1.933	0.460	0.788	11.16	31.57	7.95
110100	2	910913	1024	22	15.9	32.0	1	1.00	7.53	1.604	1.203	1.818	0.510	0.788	12.24	32.00	7.95
110101	1	910913	1136	23	15.9	31.9	2	2.00	7.46	1.804	0.862	2.566	0.600	0.705	11.79	30.83	8.14
110101	2	910913	1136	23	15.9	31.9	2	2.00	7.46	1.403	1.824	2.796	0.440	0.705	11.20	28.95	8.09
110102	1	910916	1040	2	14.2	30.0	1	11.00	7.09	1.828	1.300	3.429	4.370	0.877	10.85	34.60	7.84
110102	2	910916	1040	2	14.2	30.0	1	11.00	7.09	1.604	1.484	3.141	4.750	0.892	10.95	37.14	7.93
110103	1	910916	1115	3	15.0	29.5	1	11.50	7.15	1.804	0.722	3.141	4.220	0.982	9.95	37.23	8.26
110103	2	910916	1115	3	15.0	29.5	1	11.50	7.15	1.203	1.463	2.969	3.000	0.990	10.17	31.25	8.29
110104	1	910916	1122	5	15.0	30.0	5	11.50	7.18	1.203	0.762	3.141	4.250	1.013	11.47	35.45	8.20
110104	2	910916	1122	5	15.0	30.0	5	11.50	7.18	1.203	0.200	3.314	4.510	0.990	14.60	34.28	8.21
110105	1	910916	1135	7	15.0	30.2	5	0.00	7.10	1.828	0.122	2.510	4.600	0.892	11.30	34.86	8.20
110105	2	910916	1135	7	15.0	30.2	5	0.00	7.10	2.807	1.403	2.626	3.210	0.870	10.16	37.75	8.21
110106	1	910916	1148	8	15.0	30.2	3	0.00	7.20	1.804	0.120	2.510	5.240	1.329	10.37	37.00	8.23
110106	2	910916	1148	8	15.0	30.2	3	0.00	7.20	0.802	1.303	2.279	4.070	1.306	12.44	55.00	8.25
110107	1	910916	1157	6	15.2	30.2	3	0.00	6.96	1.203	1.183	3.026	5.290	1.050	10.78	35.57	8.15
110107	2	910916	1157	6	15.2	30.2	3	0.00	6.96	1.002	0.962	3.141	4.820	1.035	9.54	38.04	8.19
110108	1	910916	1206	4	15.2	30.5	4	0.00	7.15	1.403	0.982	4.119	5.180	1.058	9.04	32.95	8.24
110108	2	910916	1206	4	15.2	30.5	4	0.00	7.15	1.604	0.922	4.119	5.080	1.043	10.06	32.65	8.07
110109	1	910916	1357	21	16.0	30.0	1	2.00	7.13	0.200	3.448	3.717	3.970	1.008	10.64	37.25	8.06
110109	2	910916	1357	21	16.0	30.0	1	2.00	7.13	0.601	1.644	3.659	4.010	1.008	10.43	36.00	8.05
110110	1	910916	1407	20	15.8	30.0	2	2.00	6.88	1.604	1.063	2.865	4.970	0.939	9.39	33.33	8.12
110110	2	910916	1407	20	15.8	30.0	2	2.00	6.88	1.203	1.604	3.126	4.980	0.917	10.12	36.08	8.08
110111	1	910916	1420	19	15.8	30.0	5	2.00	7.18	0.601	2.486	3.256	4.950	0.970	8.03	29.87	8.02
110111	2	910916	1420	19	15.8	30.0	5	2.00	7.18	0.802	2.285	3.084	4.990	0.955	6.99	32.83	8.10
110112	1	910916	1435	18	15.0	30.0	4	3.00	7.62	0.414	1.761	2.395	4.020	1.005	8.66	34.94	7.95
110112	2	910916	1435	18	15.0	30.0	4	3.00	7.62	1.203	0.762	2.510	4.580	0.982	8.55	34.14	7.97
110113	1	910916	1447	17	17.1	29.2	2	3.00	7.03	0.802	1.022	3.608	5.620	0.886	10.15	39.17	7.89
110113	2	910916	1447	17	17.1	29.2	2	3.00	7.03	1.804	0.301	3.608	5.740	0.894	9.51	37.07	8.03
110114	1	910916	1500	14	15.9	30.0	1	3.00	6.97	1.604	0.642	2.568	5.320	1.015	8.45	32.09	7.96
110114	2	910916	1500	14	15.9	30.0	1	3.00	6.97	1.604	0.361	2.799	3.570	1.000	8.34	32.50	7.95
110115	1	910917	1140	10	16.0	29.0	9	11.00	7.09	0.000	3.087	2.164	5.340	1.043	9.03	40.47	7.74
110115	2	910917	1140	10	16.0	29.0	9	11.00	7.09	0.401	2.546	2.048	5.280	1.035	8.49	36.70	7.73
110116	1	910917	1200	12	16.0	29.2	9	11.50	8.14	1.002	1.664	2.972	5.590	1.043	9.19	39.50	7.57
110116	2	910917	1200	12	16.0	29.2	9	11.50	8.14	1.002	1.804	2.799	4.240	1.028	7.91	37.83	7.55
110117	1	910917	1215	13	16.0	29.5	8	11.50	9.05	0.802	2.145	3.030	5.410	1.058	10.69	36.63	7.68
110117	2	910917	1215	13	16.0	29.5	8	11.50	9.05	0.401	2.546	3.030	5.060	1.058	12.18	54.78	7.62

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EPAID	SUBREP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	DO	CHLA	PHAEO	NH4	NO3	PO4	TSS	% ORG	pH
110118	1	910917	1240	9	16.5	29.5	4	0.00	8.24	1.002	1.524	2.452	5.360	1.028	10.17	36.45	7.50
110118	2	910917	1240	9	16.5	29.5	4	0.00	8.24	0.601	2.205	2.279	4.680	1.058	8.47	37.50	7.70
110119	1	910917	1407	15	17.5	29.2	1	1.50	7.24	0.802	2.285	3.665	6.000	1.083	10.36	38.14	7.55
110119	2	910917	1407	15	17.5	29.2	1	1.50	7.24	0.601	2.767	3.377	5.030	1.083	8.65	38.27	7.56
110120	1	910917	1420	16	17.5	28.8	1	1.50	7.11	0.601	2.626	3.839	5.110	1.091	8.00	39.19	7.59
110120	2	910917	1420	16	17.5	28.8	1	1.50	7.11	1.604	1.764	3.839	6.010	1.068	8.43	35.89	7.61
110121	1	910917	1435	11	17.0	29.0	2	2.00	7.59	1.002	1.804	4.301	5.990	0.802	8.17	43.34	7.57
110121	2	910917	1435	11	17.0	29.0	2	2.00	7.59	1.002	1.804	4.185	5.770	0.802	8.17	39.47	7.68
110122	1	910917	1500	1	17.8	28.9	1	2.50	7.13	1.403	2.386	1.990	3.720	0.651	8.84	37.80	7.82
110122	2	910917	1500	1	17.8	28.9	1	2.50	7.13	2.005	0.662	2.279	2.020	0.666	9.49	36.36	7.86
110123	1	911113	1015	23	8.5	28.0	2	0.00	16.16	1.402	1.542	0.837	4.544	0.498	11.95	26.85	8.37
110123	2	911113	1015	23	8.5	28.0	2	0.00	16.16	1.802	2.263	1.217	1.881	0.346	9.96	30.00	8.35
110124	1	911113	1150	15	7.8	22.2	2	2.00	12.56	1.202	0.481	2.418	6.778	0.331	9.43	28.76	8.09
110124	2	911113	1150	15	7.8	22.2	2	2.00	12.56	1.202	0.481	1.727	6.959	0.312	10.33	30.00	8.06
110125	1	911113	1300	10	8.0	24.0	9	2.00	16.76	1.202	0.340	3.198	6.379	0.327	10.74	25.28	8.12
110125	2	911113	1300	10	8.0	24.0	9	2.00	16.76	1.602	0.200	3.036	5.473	0.362	11.11	27.77	8.13
110126	1	911113	1320	8	8.5	23.5	3	2.50	15.49	1.802	0.160	3.016	4.985	0.070	10.25	31.70	8.10
110126	2	911113	1320	8	8.5	23.5	3	2.50	15.49	2.003	0.661	2.185	4.998	0.520	13.00	30.76	8.10
110127	1	911113	1345	1	7.8	24.0	1	3.00	15.87	1.202	0.200	1.943	5.058	0.922	11.85	27.08	7.97
110127	2	911113	1345	1	7.8	24.0	1	3.00	15.87	1.402	0.140	2.680	5.605	0.209	9.38	30.26	7.98
110431	1	911217	756	1	3.4	19.0	3	6.00	11.14	0.200	2.043	1.808	13.277	0.440	10.04	18.06	7.86
110431	2	911217	756	1	3.4	19.0	3	6.00	11.14	0.401	1.702	2.234	11.238	0.356	7.95	15.79	7.98
110432	1	911217	915	10	5.7	19.9	10	8.00	9.52	0.601	2.483	0.569	9.845	0.480	9.83	15.28	8.12
110432	2	911217	915	10	5.7	19.9	10	8.00	9.52	0.601	1.922	0.544	9.853	0.190	8.46	19.35	8.12
110433	1	911217	1010	8	4.7	23.5	4	9.00	10.39	0.401	2.263	0.977	10.090	0.351	7.63	16.39	8.07
110433	2	911217	1010	8	4.7	23.5	4	9.00	10.39	0.601	1.922	1.654	10.410	0.283	7.88	11.11	8.10
110434	1	911217	1340	15	4.1	20.0	1	0.00	10.63	0.200	2.884	1.379	12.209	0.222	7.08	23.07	8.05
110434	2	911217	1340	15	4.1	20.0	1	0.00	10.63	0.601	1.922	1.963	11.830	0.174	11.58	16.47	8.04
110435	1	911231	1140	23	2.8	28.0	2	10.00	12.52	0.601	3.184	10.037	8.137	0.325	12.06	9.17	7.99
110435	2	911231	1140	23	2.8	28.0	2	10.00	12.52	1.001	2.643	9.123	9.962	0.164	9.30	8.33	8.02
110436	1	920115	815	23	2.5	21.0	2	10.00	13.15	0.801	2.563	3.240	5.047	0.709	19.95	15.33	8.20
110436	2	920115	815	23	2.5	21.0	2	10.00	13.15	0.401	3.104	4.010	6.191	1.447	22.74	16.37	8.24
110437	1	920116	830	1	2.3	24.0	2	8.00	12.72	0.200	2.603	3.520	6.645	0.633	11.36	19.56	8.26
110437	2	920116	830	1	2.3	24.0	2	8.00	12.72	0.401	2.683	4.560	6.505	0.588	12.34	16.00	8.75
110438	1	920116	900	8	3.3	31.0	4	8.00	12.55	0.200	2.743	7.860	5.499	0.874	10.92	18.52	8.31
110438	2	920116	900	8	3.3	31.0	4	8.00	12.55	0.200	3.284	8.710	5.157	0.648	10.11	16.00	8.25
110439	1	920116	930	10	3.7	30.0	10	9.00	11.87	0.801	1.862	6.380	4.090	0.769	13.35	17.19	8.16
110439	2	920116	930	10	3.7	30.0	10	9.00	11.87	0.801	1.442	5.300	8.776	0.663	10.64	19.61	8.19

(Contd)

EPAID	SUBREP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	DO	CHLA	PHAEO	NH4	NO3	PO4	TSS	% ORG	pH
110440	1	920116	1000	16	3.6	23.0	2	10.00	12.99	1.001	1.802	2.570	8.108	0.905	8.86	18.57	8.14
110440	2	920116	1000	16	3.6	23.0	2	10.00	12.99	0.601	2.203	2.090	7.306	1.854	10.26	14.81	8.21
110441	1	920116	1030	15	2.2	22.0	2	9.00	13.32	1.202	0.901	13.250	6.921	0.528	11.94	17.39	8.05
110441	2	920116	1030	15	2.2	22.0	2	9.00	13.32	0.200	2.443	10.930	8.090	0.693	16.62	14.06	8.17
110442	1	920217	1038	1	2.0	26.0	3	7.00	11.50	0.401	0.441	1.370	7.954	0.873	18.96	18.51	7.98
110442	2	920217	1038	1	2.0	26.0	3	7.00	11.50	1.001	0.160	2.270	7.317	0.536	17.09	15.07	8.12
110443	1	920217	1110	8	2.5	28.0	4	7.00	10.20	0.401	0.721	0.700	5.502	0.738	18.92	17.54	8.17
110443	2	920217	1110	8	2.5	28.0	4	7.00	10.20	0.401	1.001	0.750	6.853	0.910	19.04	16.28	8.20
110444	1	920217	1125	10	2.8	28.2	10	7.00	10.40	0.801	0.180	0.360	7.133	0.873	18.93	14.53	8.19
110444	2	920217	1125	10	2.8	28.2	10	7.00	10.40	1.001	0.541	1.270	6.680	0.843	18.27	18.07	8.20
110445	1	920217	1147	15	2.8	28.5	2	8.00	10.60	1.802	0.681	0.510	6.093	0.850	18.54	16.47	8.20
110445	2	920217	1147	15	2.8	28.5	2	8.00	10.60	1.202	0.080	1.240	6.169	0.813	18.54	18.23	8.19
110446	1	920217	1158	16	2.7	28.2	3	8.00	10.60	1.001	0.401	0.980	6.342	0.910	18.93	19.19	8.13
110446	2	920217	1158	16	2.7	28.2	3	8.00	10.60	1.202	0.060	0.990	6.225	0.895	18.38	15.57	8.13
110447	1	920218	815	23	2.0	28.2	2	4.00	11.10	0.200	1.622	0.940	6.570	0.783	23.99	16.51	8.07
110447	2	920218	815	23	2.0	28.2	2	4.00	11.10	0.801	0.881	0.870	6.023	0.843	21.90	16.08	8.17
110448	1	920305	1045	1	3.0	25.9	2	5.00	11.20	1.402	1.262	5.759	6.986	0.848	8.57	23.29	8.05
110448	2	920305	1045	1	3.0	25.9	2	5.00	11.20	0.601	0.040	3.709	7.976	0.690	6.93	20.34	8.09
110449	1	920305	1015	8	3.2	26.5	5	5.00	10.90	0.801	0.040	2.428	7.720	0.818	7.16	22.58	7.97
110449	2	920305	1015	8	8.0	26.5	5	5.00	10.90	0.801	0.040	4.681	8.097	0.728	6.58	22.80	8.08
110450	1	920305	1105	10	3.0	27.1	10	5.00	10.90	1.402	0.841	5.903	7.026	0.833	5.90	19.23	8.14
110450	2	920305	1105	10	3.0	27.1	10	5.00	10.90	1.402	1.121	1.976	5.188	0.765	6.13	22.22	8.13
110451	1	920305	927	15	2.6	24.9	2	4.00	10.70	1.202	0.360	3.465	9.648	0.720	6.27	23.08	8.16
110451	2	920305	927	15	2.6	24.9	2	4.00	10.70	0.601	0.380	6.697	8.008	0.728	7.23	18.33	8.18
110452	1	920305	942	16	2.7	25.2	2	4.00	10.80	0.401	0.300	3.240	8.186	0.713	6.34	24.53	8.17
110452	2	920305	942	16	2.7	25.2	2	4.00	10.80	0.200	1.462	4.898	9.254	0.698	6.22	19.23	8.18
110453	1	920305	1200	23	3.5	29.1	3	6.00	11.30	0.801	0.661	5.253	5.804	0.765	6.22	22.41	8.21
110453	2	920305	1200	23	3.5	29.1	3	6.00	11.30	0.401	0.120	5.227	5.197	0.788	6.43	25.00	8.21
110454	1	920422	920	23	8.2	20.5	1	0.00	10.80	1.202	0.220	3.099	0.553	0.485	13.86	13.59	8.21
110454	2	920422	920	23	8.2	20.5	1	0.00	10.80	1.001	0.120	3.651	1.050	0.478	10.50	17.95	8.21
110455	1	920423	1150	1	10.9	26.0	2	3.00	10.80	0.401	2.964	1.884	0.573	0.618	17.44	18.79	7.97
110455	2	920423	1150	1	10.9	26.0	2	3.00	10.80	1.202	1.742	1.994	1.912	0.456	16.50	19.15	7.97
110456	1	920423	954	8	7.1	26.2	3	1.00	10.60	1.202	2.163	18.493	1.288	0.471	11.76	20.79	8.23
110456	2	920423	954	8	7.1	26.2	3	1.00	10.60	1.402	2.103	2.805	0.441	0.412	13.04	15.18	8.23
110457	1	920423	1011	10	8.0	23.5	9	1.00	10.60	2.804	2.383	0.926	0.802	0.404	13.63	20.18	8.31
110457	2	920423	1011	10	8.0	23.5	9	1.00	10.60	2.603	2.723	1.394	1.684	0.412	14.50	16.38	8.31
110458	1	920423	1030	15	8.5	22.5	1	1.50	10.50	2.803	2.593	11.806	0.713	1.412			8.29
110458	2	920423	1030	15	8.5	22.5	1	1.50	10.50	2.603	2.864	1.712	8.716	0.397	12.57	17.35	8.29

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EPAID	SUBREP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	DO	CHLA	PHAEO	NH4	NO3	PO4	TSS	% ORG	pH
110459	1	920423	1022	16	7.9	22.9	1	1.00	10.70	2.804	1.682	1.321	1.218	0.706	12.82	18.81	8.31
110459	2	920423	1022	16	7.9	22.9	1	1.00	10.70	2.203	2.563	1.649	8.956	0.507	14.60	17.39	8.31
110460	1	920520	1038	15	12.5	23.7	1	2.00	9.60	3.805	0.160	0.880	1.853	0.251	9.45	15.79	8.14
110460	2	920520	1038	15	12.5	23.7	1	2.00	9.60	2.804	1.402	1.052	1.694	0.436	8.96	13.89	8.14
110461	1	920520	1045	16	12.5	23.7	1	2.00	9.80	2.003	2.483	0.827	0.771	0.448	8.71	15.71	8.09
110461	2	920520	1045	16	12.5	23.7	1	2.00	9.80	3.338	1.041	3.745	0.496	0.467	8.58	17.39	8.09
110462	1	920520	1115	8	11.5	25.2	4	3.00	10.30	2.003	0.180	0.873	1.714	0.421	8.49	16.90	8.13
110462	2	920520	1115	8	11.5	25.2	4	3.00	10.30	2.003	0.380	0.901	2.735	0.452	7.66	15.63	8.13
110463	1	920520	1210	10	12.5	24.2	10	3.50	10.00	1.802	1.982	1.249	3.178	0.459	8.10	16.67	8.10
110463	2	920520	1210	10	12.5	24.2	10	3.50	10.00	2.403	1.242	0.913	1.510	0.463	7.98	18.46	8.10
110464	1	920520	1230	1	12.5	25.5	2	4.00	11.40	1.402	1.402	2.068	3.503	0.429	8.90	6.67	8.10
110464	2	920520	1230	1	12.5	25.5	2	4.00	11.40	1.602	1.202	1.454	1.355	1.085	7.48	14.29	8.10
110465	1	920521	805	23	10.8	25.1	1	11.00	11.10	1.202	1.041	1.529	0.830	0.371	9.47	16.46	8.17
110465	2	920521	805	23	10.8	25.1	1	11.00	11.10	0.401	2.683	0.733	2.370	0.471	8.75	17.81	8.17
110466	1	920615	810	23	14.2	25.5	2	2.00	8.70	1.202	1.041	1.138	0.445	0.354	16.85	10.56	7.96
110466	2	920615	810	23	14.2	25.5	2	2.00	8.70	1.202	1.181	1.042	0.372	0.878	15.19	10.94	7.96
110467	1	920616	924	15	16.1	24.0	2	2.50	8.90	1.001	1.001	4.416	4.304	0.620	13.95	23.01	7.98
110467	2	920616	924	15	16.1	24.0	2	2.50	8.90	1.001	0.821	3.169	3.215	0.506	15.92	21.70	7.98
110468	1	920616	934	16	16.3	23.8	2	2.50	8.90	1.402	0.140	1.955	2.696	0.567	14.02	17.70	7.95
110468	2	920616	934	16	16.3	23.8	2	2.50	8.90	1.802	0.721	3.399	4.229	0.620	15.51	21.60	7.95
110469	1	920616	950	10	15.5	25.0	10	3.00	9.20	0.801	1.302	2.687	3.264	0.582	14.79	21.14	7.97
110469	2	920616	950	10	15.5	25.0	10	3.00	9.20	1.001	0.961	3.080	2.354	0.529	15.27	16.54	7.97
110470	1	920616	1003	8	14.3	27.0	4	3.50	9.70	0.861	0.499	2.018	1.927	0.521	11.96	12.38	7.93
110470	2	920616	1003	8	14.3	27.0	4	3.50	9.70	1.262	0.238	3.006	1.953	0.247	12.07	15.09	7.93
110471	1	920616	1048	1	14.9	29.0	2	4.00	10.10	1.001	0.821	2.547	1.258	0.544	10.10	11.70	8.03
110471	2	920616	1048	1	14.9	29.0	2	4.00	10.10	1.001	0.541	4.088	2.017	0.544	11.39	21.70	8.03

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Appendix D
WATER TOXICITY

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
DUP	Duplicate sample identification within a replicate.
DATE	Range of collection dates MM/DD for which sample was collected.
TDATE	Date of the test expressed as YYMMDD.
DATECNTD	Date that the test was counted (MM/DD).
EXPNUM	SAIC, Environmental Testing Center experiment number.
TREAT	SAIC, Environmental Testing Center treatment description, also the location of the station.
UNFERT	Number of unfertilized eggs.

Arbacia Punctulata SPERM CELL TOXICITY TEST

EPAID	REP	DUP	DATE	TDATE	DATECNTD	EXPNUM	TREAT	UNFERT
110122	A	1	9/13-9/17	911008	10/8-10/9	911009	STA1	2
110122	A	2	9/13-9/17	911008	10/8-10/9	911009	STA1	1
110122	A	3	9/13-9/17	911008	10/8-10/9	911009	STA1	0
110115	A	1	9/13-9/17	911008	10/8-10/9	911009	STA10	2
110115	A	2	9/13-9/17	911008	10/8-10/9	911009	STA10	2
110115	A	3	9/13-9/17	911008	10/8-10/9	911009	STA10	3
110121	A	1	9/13-9/17	911008	10/8-10/9	911009	STA11	4
110121	A	2	9/13-9/17	911008	10/8-10/9	911009	STA11	4
110121	A	3	9/13-9/17	911008	10/8-10/9	911009	STA11	1
110116	A	1	9/13-9/17	911008	10/8-10/9	911009	STA12	2
110116	A	2	9/13-9/17	911008	10/8-10/9	911009	STA12	3
110116	A	3	9/13-9/17	911008	10/8-10/9	911009	STA12	2
110117	A	1	9/13-9/17	911008	10/8-10/9	911009	STA13	4
110117	A	2	9/13-9/17	911008	10/8-10/9	911009	STA13	4
110117	A	3	9/13-9/17	911008	10/8-10/9	911009	STA13	0
110114	A	1	9/13-9/17	911008	10/8-10/9	911009	STA14	3
110114	A	2	9/13-9/17	911008	10/8-10/9	911009	STA14	9
110114	A	3	9/13-9/17	911008	10/8-10/9	911009	STA14	12
110119	A	1	9/13-9/17	911008	10/8-10/9	911009	STA15	0
110119	A	2	9/13-9/17	911008	10/8-10/9	911009	STA15	1
110119	A	3	9/13-9/17	911008	10/8-10/9	911009	STA15	0
110120	A	1	9/13-9/17	911008	10/8-10/9	911009	STA16	0
110120	A	2	9/13-9/17	911008	10/8-10/9	911009	STA16	2
110120	A	3	9/13-9/17	911008	10/8-10/9	911009	STA16	1
110113	A	1	9/13-9/17	911008	10/8-10/9	911009	STA17	1
110113	A	2	9/13-9/17	911008	10/8-10/9	911009	STA17	4
110113	A	3	9/13-9/17	911008	10/8-10/9	911009	STA17	0
110112	A	1	9/13-9/17	911008	10/8-10/9	911009	STA18	2
110112	A	2	9/13-9/17	911008	10/8-10/9	911009	STA18	4
110112	A	3	9/13-9/17	911008	10/8-10/9	911009	STA18	3
110111	A	1	9/13-9/17	911008	10/8-10/9	911009	STA19	2
110111	A	2	9/13-9/17	911008	10/8-10/9	911009	STA19	5
110111	A	3	9/13-9/17	911008	10/8-10/9	911009	STA19	1
110102	A	1	9/13-9/17	911008	10/8-10/9	911009	STA2	6
110102	A	2	9/13-9/17	911008	10/8-10/9	911009	STA2	7
110102	A	3	9/13-9/17	911008	10/8-10/9	911009	STA2	20
110110	A	1	9/13-9/17	911008	10/8-10/9	911009	STA20	1
110110	A	2	9/13-9/17	911008	10/8-10/9	911009	STA20	3
110110	A	3	9/13-9/17	911008	10/8-10/9	911009	STA20	1
110109	A	1	9/13-9/17	911008	10/8-10/9	911009	STA21	2
110109	A	2	9/13-9/17	911008	10/8-10/9	911009	STA21	9
110109	A	3	9/13-9/17	911008	10/8-10/9	911009	STA21	11
110100	A	1	9/13-9/17	911008	10/8-10/9	911009	STA22	0
110100	A	2	9/13-9/17	911008	10/8-10/9	911009	STA22	3
110100	A	3	9/13-9/17	911008	10/8-10/9	911009	STA22	7
110101	A	1	9/13-9/17	911008	10/8-10/9	911009	STA23	2
110101	A	2	9/13-9/17	911008	10/8-10/9	911009	STA23	3
110101	A	3	9/13-9/17	911008	10/8-10/9	911009	STA23	2
110103	A	1	9/13-9/17	911008	10/8-10/9	911009	STA3	7
110103	A	2	9/13-9/17	911008	10/8-10/9	911009	STA3	8
110103	A	3	9/13-9/17	911008	10/8-10/9	911009	STA3	14
110108	A	1	9/13-9/17	911008	10/8-10/9	911009	STA4	34
110108	A	2	9/13-9/17	911008	10/8-10/9	911009	STA4	38

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EPAID	REP	DUP	DATE	TDATE	DATECNTD	EXPNUM	TREAT	UNFERT
110108	A	3	9/13-9/17	911008	10/8-10/9	911009	STA4	15
110104	A	1	9/13-9/17	911008	10/8-10/9	911009	STA5	4
110104	A	2	9/13-9/17	911008	10/8-10/9	911009	STA5	8
110104	A	3	9/13-9/17	911008	10/8-10/9	911009	STA5	0
110107	A	1	9/13-9/17	911008	10/8-10/9	911009	STA6	2
110107	A	2	9/13-9/17	911008	10/8-10/9	911009	STA6	1
110107	A	3	9/13-9/17	911008	10/8-10/9	911009	STA6	3
110105	A	1	9/13-9/17	911008	10/8-10/9	911009	STA7	11
110105	A	2	9/13-9/17	911008	10/8-10/9	911009	STA7	8
110105	A	3	9/13-9/17	911008	10/8-10/9	911009	STA7	12
110106	A	1	9/13-9/17	911008	10/8-10/9	911009	STA8	7
110106	A	2	9/13-9/17	911008	10/8-10/9	911009	STA8	4
110106	A	3	9/13-9/17	911008	10/8-10/9	911009	STA8	7
110118	A	1	9/13-9/17	911008	10/8-10/9	911009	STA9	1
110118	A	2	9/13-9/17	911008	10/8-10/9	911009	STA9	1
110118	A	3	9/13-9/17	911008	10/8-10/9	911009	STA9	1
112000	A	1	9/13-9/17	911008	10/8-10/9	911009	SW	2
112000	A	2	9/13-9/17	911008	10/8-10/9	911009	SW	5
112000	A	3	9/13-9/17	911008	10/8-10/9	911009	SW	5

Appendix E

MICROBIAL CONTAMINATION IN WATER AND SEDIMENTS

1. SEDIMENT CORE SAMPLES

VARIABLE LIST:

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification. Designation of depth from which sediment core was sampled, presented as a letter starting with A (surface) and continuing with the alphabet to lower samples.
DUP	Duplicate sample identification within a replicate.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).
COLMETH	Type of sediment core sample collection method.
MPN	Concentration of *C. perfringens* expressed as the mean of two analytical replicates of MPN, or most probable number, per gram wet weight of sediment.
SDMPN	Standard deviation of the two analytical replicates of MPN per gram wet weight for each core depth.

SEDIMENT CORE MICROBIOLOGY

EPAID	REP	CDATE	CTIME	STA	COLMETH	MPN	SDMPN
110015	A	910916	10:40	15	vibracore	7000	2828
110015	B	910916	10:40	15	vibracore	1	0
110015	C	910916	10:40	15	vibracore	1600	0
110015	D	910916	10:40	15	vibracore	16250	354
110016	A	910916	11:00	16	vibracore	2350	919
110016	B	910916	11:00	16	vibracore	4000	1414
110016	C	910916	11:00	16	vibracore	3	1
110016	D	910916	11:00	16	vibracore	1	0
110017	A	910916	11:30	17	vibracore	16250	354
110017	B	910916	11:30	17	vibracore	5000	0
110017	C	910916	11:30	17	vibracore	1400	424
110014	A	910916	12:30	14	vibracore	1400	424
110014	B	910916	12:30	14	vibracore	270	42
110014	C	910916	12:30	14	vibracore	37	19
110019	A	910916	14:00	19	vibracore	7000	2828
110019	B	910916	14:00	19	vibracore	9200	9617
110019	C	910916	14:00	19	vibracore	1500	283
110004	A	910916	14:30	4	vibracore	5000	0
110004	B	910916	14:30	4	vibracore	10500	7778
110002	A	910918	10:00	2	vibracore	9000	0
110002	B	910918	10:00	2	vibracore	7000	2828
110002	C	910918	10:00	2	vibracore	550	354
110003	A	910918	10:30	3	vibracore	9750	9546
110003	B	910918	10:30	3	vibracore	7000	2828
110005	A	910918	11:10	5	vibracore	9500	9192
110005	B	910918	11:10	5	vibracore	16250	354
110005	C	910918	11:10	5	vibracore	7000	2828
110007	A	910918	11:30	7	vibracore	9000	0
110007	B	910918	11:30	7	vibracore	7000	2828
110007	C	910918	11:30	7	vibracore	650	212
110008	A	910918	12:00	8	vibracore	4000	1414
110008	B	910918	12:00	8	vibracore	6000	4243
110006	A	910918	12:30	6	vibracore	6000	4243
110006	B	910918	12:30	6	vibracore	162	195
110001	A	910919	09:45	1	vibracore	3000	0
110001	B	910919	09:45	1	vibracore	800	707
110010	A	910926	10:00	10	vibracore	7000	2828
110010	B	910926	10:00	10	vibracore	9000	0
110010	C	910926	10:00	10	vibracore	3000	0
110010	D	910926	10:00	10	vibracore	16250	354
110010	E	910926	10:00	10	vibracore	10500	7778
110011	A	910926	10:45	11	vibracore	12500	4950
110011	B	910926	10:45	11	vibracore	2	1
110011	C	910926	10:45	11	vibracore	1	0
110012	A	910926	11:00	12	vibracore	3000	0
110012	B	910926	11:00	12	vibracore	4900	5798
110012	C	910926	11:00	12	vibracore	10750	8132
110013	A	910926	12:15	13	vibracore	2580	3422
110013	B	910926	12:15	13	vibracore	12500	4950
110013	C	910926	12:15	13	vibracore	24	9
110020	A	911115	10:30	20	vibracore	1200	141
110020	B	911115	10:30	20	vibracore	14	8
110020	C	911115	10:30	20	vibracore	1	0
110021	A	911115	11:00	21	vibracore	2600	566
110021	B	911115	11:00	21	vibracore	1000	990
110021	C	911115	11:00	21	vibracore	400	141
110021	D	911115	11:00	21	vibracore	1	0

2. SEDIMENT GRAB SAMPLES

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).
COLMETH	Type of sediment core sample collection method.
MPN	Concentration of *C. perfringens* expressed as the mean of two analytical replicates of MPN, or most probable number, per gram wet weight of sediment.

SEDIMENT GRAB MICROBIOLOGY

EPAID	REP	CDATE	CTIME	STA	COLMETH	MPN
110210	1	910909	14:09	19	boxcore	500
110210	2	910909	14:09	19	boxcore	9000
110210	3	910909	14:09	19	boxcore	2400
110210	4	910909	14:09	19	boxcore	160
110211	1	910909	16:05	18	boxcore	3000
110211	2	910909	16:05	18	boxcore	500
110211	3	910909	16:05	18	boxcore	9000
110211	4	910909	16:05	18	boxcore	3000
110213	1	910910	08:30	21	boxcore	3000
110213	2	910910	08:30	21	boxcore	2200
110213	3	910910	08:30	21	boxcore	5000
110213	4	910910	08:30	21	boxcore	2200
110212	1	910910	10:30	16	boxcore	3000
110212	2	910910	10:30	16	boxcore	1100
110212	3	910910	10:30	16	boxcore	1300
110212	4	910910	10:30	16	boxcore	9000
110215	1	910910	11:35	15	boxcore	16000
110215	2	910910	11:35	15	boxcore	800
110215	3	910910	11:35	15	boxcore	2400
110215	4	910910	11:35	15	boxcore	2400
110214	1	910910	12:45	14	boxcore	2400
110214	2	910910	12:45	14	boxcore	1300
110214	3	910910	12:45	14	boxcore	1700
110214	4	910910	12:45	14	boxcore	500
110216	1	910910	14:15	11	boxcore	3000
110216	2	910910	14:15	11	boxcore	1100
110216	3	910910	14:15	11	boxcore	2200
110216	4	910910	14:15	11	boxcore	240
110217	1	910910	15:25	17	boxcore	5000
110217	2	910910	15:25	17	boxcore	9000
110217	3	910910	15:25	17	boxcore	9000
110217	4	910910	15:25	17	boxcore	2800
110218	1	910911	10:55	12	boxcore	6000
110218	2	910911	10:55	12	boxcore	18000
110218	3	910911	10:55	12	boxcore	1100
110218	4	910911	10:55	12	boxcore	1700
110219	1	910911	12:30	13	boxcore	2800
110219	2	910911	12:30	13	boxcore	3000
110219	3	910911	12:30	13	boxcore	2400
110219	4	910911	12:30	13	boxcore	5000
110220	1	910911	13:45	10	boxcore	3200
110220	2	910911	13:45	10	boxcore	3200
110220	3	910911	13:45	10	boxcore	320
110220	4	910911	13:45	10	boxcore	32000
110222	1	910911	16:55	04	boxcore	5000
110222	2	910911	16:55	04	boxcore	5000
110222	3	910911	16:55	04	boxcore	3000
110222	4	910911	16:55	04	boxcore	3000
110223	1	910912	09:55	20	boxcore	500
110223	2	910912	09:55	20	boxcore	90
110223	3	910912	09:55	20	boxcore	170
110223	4	910912	09:55	20	boxcore	1600
110232	1	910912	10:05	05	boxcore	0

(Contd)

EPAID	REP	CDATE	CTIME	STA	COLMETH	MPN
110232	2	910912	10:05	05	boxcore	9000
110232	3	910912	10:05	05	boxcore	5000
110232	4	910912	10:05	05	boxcore	5000
110224	1	910912	13:15	06	boxcore	300
110224	2	910912	13:15	06	boxcore	1600
110224	3	910912	13:15	06	boxcore	16000
110224	4	910912	13:15	06	boxcore	1700
110225	1	910912	14:05	08	boxcore	3000
110225	2	910912	14:05	08	boxcore	2400
110225	3	910912	14:05	08	boxcore	1600
110225	4	910912	14:05	08	boxcore	2800
110226	1	910912	15:05	07	boxcore	1700
110226	2	910912	15:05	07	boxcore	1700
110226	3	910912	15:05	07	boxcore	9000
110226	4	910912	15:05	07	boxcore	3000
110227	1	910913	12:35	23	boxcore	900
110227	2	910913	12:35	23	boxcore	1300
110227	3	910913	12:35	23	boxcore	1400
110227	4	910913	12:35	23	boxcore	1300
110228	1	910913	13:50	22	boxcore	500
110228	2	910913	13:50	22	boxcore	500
110228	3	910913	13:50	22	boxcore	300
110228	4	910913	13:50	22	boxcore	500
110229	1	910916	10:05	09	boxcore	9000
110229	2	910916	10:05	09	boxcore	5000
110229	3	910916	10:05	09	boxcore	2400
110229	4	910916	10:05	09	boxcore	9000
110230	1	910916	11:20	02	boxcore	5000
110230	2	910916	11:20	02	boxcore	5000
110230	3	910916	11:20	02	boxcore	2400
110230	4	910916	11:20	02	boxcore	3000
110221	1	910916	12:15	01	boxcore	1400
110221	2	910916	12:15	01	boxcore	1700
110221	3	910916	12:15	01	boxcore	800
110221	4	910916	12:15	01	boxcore	1300
110231	1	910916	14:05	03	boxcore	1700
110231	2	910916	14:05	03	boxcore	9000
110231	3	910916	14:05	03	boxcore	3000
110231	4	910916	14:05	03	boxcore	2400

3. WATER SAMPLES

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
SUBREP	Replicate identification.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
DATE	Date of collection, as YYMMDD.
CTIME	Collection time (from CUSTODY database).
TIME	Time of sample collection, as HH:MM.
STA	University of New Hampshire station identifier (from CUSTODY database).
MNCFU	Concentration of *C. perfringens* expressed as the mean of two analytical replicates of CFU, or coliform forming units, per 100 ml of water.
SDCFU	Standard deviation of two analytical replicates of CFU per 100 ml for each sample.

WATER MICROBIOLOGY

EPAID	SUBREP	CDATE	DATE	CTIME	TIME	STA	MNCFU	SDCFU
110100	1	910913	910917	10:35	15:00	22	0.500	0.710
110100	2	910913	910917	10:35	15:00	22	1.000	1.410
110101	1	910913	910916	11:35	10:40	23	3.500	2.120
110101	2	910913	910916	11:35	10:40	23	2.500	0.710
110102	1	910916	910916	10:40	11:15	2	13.000	0.000
110102	2	910916	910916	10:40	11:15	2	10.500	3.540
110103	1	910916	910916	11:15	12:06	3	11.500	0.710
110103	2	910916	910916	11:15	12:06	3	8.500	2.120
110104	1	910916	910916	11:22	11:22	5	11.000	0.000
110104	2	910916	910916	11:22	11:22	5	10.000	0.000
110105	1	910916	910916	11:35	11:57	7	4.500	0.710
110105	2	910916	910916	11:35	11:57	7	9.000	0.000
110106	1	910916	910916	11:48	11:35	8	5.500	3.540
110106	2	910916	910916	11:48	11:35	8	5.500	2.120
110107	1	910916	910916	11:57	11:48	6	4.500	0.710
110107	2	910916	910916	11:57	11:48	6	2.000	2.830
110108	1	910916	910917	12:00	12:40	4	3.500	2.120
110108	2	910916	910917	12:00	12:40	4	10.000	4.240
110109	1	910916	910917	13:57	11:40	21	1.000	1.410
110109	2	910916	910917	13:57	11:40	21	1.500	2.120
110110	1	910916	910917	14:07	14:35	20	7.500	0.710
110110	2	910916	910917	14:07	14:35	20	2.500	0.710
110111	1	910916	910917	14:20	12:00	19	6.000	1.410
110111	2	910916	910917	14:20	12:00	19	6.500	2.120
110112	1	910916	910917	14:35	12:15	18	11.000	0.000
110112	2	910916	910917	14:35	12:15	18	10.000	1.410
110113	1	910916	910916	14:47	15:00	17	6.500	2.120
110113	2	910916	910916	14:47	15:00	17	5.500	2.120
110114	1	910916	910917	15:00	14:07	14	8.000	2.830
110114	2	910916	910917	15:00	14:07	14	3.500	2.120
110115	1	910917	910917	11:40	14:20	10	7.500	2.120
110115	2	910917	910917	11:40	14:20	10	11.000	1.410
110116	1	910917	910916	12:00	14:47	12	6.000	2.830
110116	2	910917	910916	12:00	14:47	12	7.500	3.540
110117	1	910917	910916	12:15	14:35	13	7.000	0.000
110117	2	910917	910916	12:15	14:35	13	4.000	0.000
110118	1	910917	910916	12:40	14:20	9	11.500	3.540
110118	2	910917	910916	12:40	14:20	9	8.500	6.360
110119	1	910917	910916	12:40	14:07	15	3.500	0.710
110119	2	910917	910916	12:40	14:07	15	7.500	2.120
110120	1	910917	910916	14:20	13:57	16	13.500	2.120
110120	2	910917	910916	14:20	13:57	16	11.000	7.070
110121	1	910917	910913	14:35	10:30	11	11.000	2.830
110121	2	910917	910913	14:35	10:30	11	6.000	0.000
110122	1	910917	910913	15:00	11:35	1	9.500	0.710
110122	2	910917	910913	15:00	11:35	1	7.500	3.540

Appendix F
EELGRASS COLLECTION AND ANALYSIS

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
DUP	Duplicate sample identification within a replicate.
DATE	Collection date expressed as YYMMDD.
TIME	Collection time.
STA	University of New Hampshire station identifier.
TEMP	Temperature (°C).
SAL	Salinity (PPT).
DEPTH	Depth (m).
TIDE	Tide (hours).
LENGTH	Leaf length (cm).
stdev	SDLENGTH, Standard deviation of the leaf length.
WIDTH	Leaf width (cm).
stdev	SDWIDTH, Standard deviation of the leaf width.
LEAF	Number of Leaves / Shoot.
stdev	SDNUML, Standard deviation of variable LEAF.
DENS	SHOOTDENS, Density as shoots / m^2.
REPROD	NUMREPROD, Number of reproductive shoots as shoots / m^2.
SPATHES	Number of Spathes / m^2.
RHIZOME	RHIZOMELEN, Rhizome length (cm / m^2).
VEGLEAF	Vegetable shoot biomass (gram / m^2).
FLOWER	Flower biomass (gram / m^2).
ROOTRHIZ	Root/Rhizome biomass (gram / m^2).
DETRITUS	Detritus in bed (gram / m^2).
ALGAE	Algae in bed biomass (gram / m^2).

SEAGRASS DATA

EPAID	REP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	LENGTH	stdev	WIDTH	stdev	LEAF	stdev	DENS	REPROD	SPATHES	RHIZOME	VEGLEAF	FLOWER	ROOTRHIZ	DETRITUS	ALGAE
110030	1	910909	11:30	032	20.80	22.0	1.00	3.00	68.90	13.40	3.90	0.60	4.90	0.30	688	64	368	2624	83.81	17.02	33.63	0.00	0.00
110030	2	910909	11:30	032	20.80	22.0	1.00	3.00	60.40	13.90	3.40	0.50	4.00	0.80	720	64	336	6320	226.99	8.14	64.64	0.00	0.00
110030	3	910909	11:30	032	20.80	22.0	1.00	3.00	50.00	19.50	3.50	0.70	4.50	0.80	256	80	368	752	55.25	15.47	8.94	0.00	0.00
110030	4	910909	11:30	032	20.80	22.0	1.00	3.00	59.30	12.20	3.40	0.50	3.90	1.20	1504	0	0	9056	248.91	0.00	105.04	31.10	0.00
110030	5	910909	11:30	032	20.80	22.0	1.00	3.00	64.10	11.60	3.50	0.50	4.40	0.50	1232	144	720	5680	257.60	12.93	59.23	43.52	0.00
110030	6	910909	11:30	032	20.80	22.0	1.00	3.00	54.20	8.40	4.40	0.70	3.80	0.90	480	16	272	2896	73.65	8.88	28.83	3.65	0.00
110031	1	910909	12:15	030	20.30	24.0	1.50	4.00	79.80	24.10	3.70	1.10	4.20	0.90	224	16	112	4840	111.41	3.92	55.73	28.83	6.29
110031	2	910909	12:15	030	20.30	24.0	1.50	4.00	73.70	22.30	4.20	0.50	4.60	0.70	256	16	192	1584	97.62	7.89	23.94	0.00	0.00
110031	3	910909	12:15	030	20.30	24.0	1.50	4.00	84.90	14.50	4.10	0.50	4.00	0.80	496	16	160	7853	264.18	5.18	129.18	0.00	2.98
110031	4	910909	12:15	030	20.30	24.0	1.50	4.00	86.00	22.20	4.40	0.60	3.50	0.80	560	0	176	1019	160.30	5.74	67.34	56.18	5.17
110031	5	910909	12:15	030	20.30	24.0	1.50	4.00	87.20	16.60	4.00	0.60	4.00	1.20	848	32	32	6288	197.38	0.75	71.01	48.99	6.66
110031	6	910909	12:15	030	20.30	24.0	1.50	4.00	78.90	31.40	3.40	0.70	3.60	0.70	592	48	288	11107	285.79	38.06	127.87	57.86	32.42
110032	1	910909	12:55	031	20.80	24.0	1.50	4.00	67.50	8.50	3.70	0.40	4.90	0.70	912	80	528	6176	102.19	15.30	47.04	26.32	0.00
110032	2	910909	12:55	031	20.80	24.0	1.50	4.00	72.40	18.80	3.60	0.60	4.60	0.50	224	0	0	3072	60.86	0.00	26.62	6.29	52.42
110032	3	910909	12:55	031	20.80	24.0	1.50	4.00	62.20	16.50	4.10	0.40	5.20	0.40	736	0	0	2320	118.29	0.00	27.09	30.16	0.00
110032	4	910909	12:55	031	20.80	24.0	1.50	4.00	69.30	26.00	3.60	0.70	4.70	0.80	512	64	704	3216	114.51	22.24	33.02	45.39	90.50
110032	5	910909	12:55	031	20.80	24.0	1.50	4.00	43.40	18.40	3.40	0.50	4.60	0.50	224	96	768	2608	89.62	34.18	21.68	16.69	145.50
110032	6	910909	12:55	031	20.80	24.0	1.50	4.00	70.90	36.10	4.50	1.20	4.70	1.50	352	64	224	3294	110.06	22.91	42.59	16.94	77.52
110033	1	910910	09:40	028	20.20	20.5	0.00	5.00	105.40	15.40	5.30	0.50	5.00	0.70	576	0	0	3056	309.17	0.00	140.50	95.01	0.00
110033	2	910910	09:40	028	20.20	20.5	0.00	5.00	114.60	14.70	4.70	0.70	4.50	1.10	352	0	0	3728	229.17	0.00	115.89	59.18	5.71
110033	3	910910	09:40	028	20.20	20.5	0.00	5.00	138.90	33.20	4.80	0.40	4.90	0.60	304	0	0	6293	453.09	0.00	181.22	121.18	0.00
110033	4	910910	09:40	028	20.20	20.5	0.00	5.00	116.10	14.90	4.90	0.60	4.70	0.70	432	0	0	3984	209.76	0.00	107.25	20.26	0.00
110033	5	910910	09:40	028	20.20	20.5	0.00	5.00	115.00	35.20	4.70	1.20	4.60	1.10	240	0	0	2973	257.55	0.00	102.58	59.33	0.00
110033	6	910910	09:40	028	20.20	20.5	0.00	5.00	113.80	22.30	4.50	0.60	5.60	1.10	256	0	0	3134	235.49	0.00	80.46	6.64	0.00
110034	1	910912	09:15	024	17.10	27.5	1.00	0.00	35.00	11.20	3.30	0.80	2.90	0.70	1216	0	0	8032	25.02	0.00	290.82	45.73	15.97
110034	2	910912	09:15	024	17.10	27.5	1.00	0.00	55.90	10.40	4.20	0.90	3.40	0.50	480	0	0	9168	259.06	0.00	692.69	101.86	0.00
110034	3	910912	09:15	024	17.10	27.5	1.00	0.00	57.00	14.30	4.70	0.70	4.40	0.70	544	0	0	5542	189.66	0.00	241.31	40.70	14.18
110034	4	910912	09:15	024	17.10	27.5	1.00	0.00	81.10	17.20	5.70	0.90	4.20	1.00	896	0	0	8160	400.82	0.00	301.73	603.38	1.23
110034	5	910912	09:15	024	17.10	27.5	1.00	0.00	52.00	17.90	3.70	0.80	3.60	0.70	432	0	0	4936	187.98	0.00	292.08	42.38	0.00
110034	6	910912	09:15	024	17.10	27.5	1.00	0.00	65.70	12.20	5.40	0.80	4.00	0.80	384	0	0	2048	147.22	0.00	85.46	13.62	0.00
110035	1	910912	10:10	025	18.20	27.5	1.00	11.50	94.00	24.20	4.40	1.10	4.70	0.80	112	0	0	1600	73.09	0.00	71.76	6.70	0.00
110035	2	910912	10:10	025	18.20	27.5	1.00	11.50	93.00	30.30	4.00	0.60	3.90	0.70	320	0	0	3416	343.34	0.00	306.54	0.00	0.00
110035	3	910912	10:10	025	18.20	27.5	1.00	11.50	91.20	40.70	4.40	1.00	3.80	0.90	416	0	0	7792	305.34	0.00	502.19	236.56	0.00
110035	4	910912	10:10	025	18.20	27.5	1.00	11.50	57.80	10.20	3.70	0.40	3.10	0.70	112	0	0	1600	156.78	0.00	91.14	100.05	0.00
110035	5	910912	10:10	025	18.20	27.5	1.00	11.50	69.10	30.50	3.70	1.20	3.90	0.80	256	0	0	3600	211.28	0.00	123.86	68.91	36.34
110035	6	910912	10:10	025	18.20	27.5	1.00	11.50	76.90	35.90	4.20	1.00	3.30	0.70	240	0	0	3576	226.22	0.00	133.65	32.70	0.00
110036	1	910912	11:30	027	19.10	26.0	1.00	0.50	60.40	23.00	3.60	0.50	4.30	1.40	304	0	0	5064	224.62	0.00	119.49	0.00	3.76

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EPAID	REP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	LENGTH	stdev	WIDTH	stdev	LEAF	stdev	DENS	REPROD	SPATHES	RHIZOME	VEGLEAF	FLOWER	ROOTRHIZ	DETRITUS	ALGAE
110036	2	910912	11:30	027	19.10	26.0	1.00	0.50	85.20	39.60	4.00	1.20	4.70	0.80	160	0	0	1000	268.32	0.00	45.50	45.97	0.00
110036	3	910912	11:30	027	19.10	26.0	1.00	0.50	75.50	25.10	3.60	0.50	4.20	1.00	480	0	0	2272	314.80	0.00	110.67	54.03	20.27
110036	4	910912	11:30	027	19.10	26.0	1.00	0.50	109.10	20.50	4.50	0.60	5.40	1.40	800	0	0	4800	746.54	0.00	281.52	16.37	0.00
110036	5	910912	11:30	027	19.10	26.0	1.00	0.50	41.70	14.90	3.30	0.40	4.40	0.70	432	0	0	2112	235.25	0.00	68.75	0.00	0.00
110036	6	910912	11:30	027	19.10	26.0	1.00	0.50	69.80	37.60	3.90	0.80	4.30	0.90	128	0	0	3888	315.49	0.00	178.37	27.06	0.00
110040	1	910913	10:30	022	15.90	27.0	1.50	1.00	89.10	23.60	4.30	0.30	3.50	0.50	304	0	0	2483	202.40	0.00	60.83	15.81	8.37
110040	2	910913	10:30	022	15.90	27.0	1.50	1.00	82.30	15.30	4.20	0.70	3.60	0.80	336	0	0	3638	224.16	0.00	147.70	0.00	0.00
110040	3	910913	10:30	022	15.90	27.0	1.50	1.00	66.70	23.80	3.40	0.60	3.50	0.50	336	0	0	3066	223.97	0.00	192.11	0.00	0.00
110040	4	910913	10:30	022	15.90	27.0	1.50	1.00	68.30	21.90	3.30	1.10	3.00	0.90	224	0	0	2704	249.89	0.00	83.22	768.02	18.90
110040	5	910913	10:30	022	15.90	27.0	1.50	1.00	70.60	16.90	4.00	0.70	2.20	0.80	224	0	0	3600	157.20	0.00	182.24	0.00	3.79
110040	6	910913	10:30	022	15.90	27.0	1.50	1.00	63.40	34.10	3.50	0.90	3.70	1.20	512	0	0	5136	287.26	0.00	165.65	0.00	0.00
110041	1	910913	11:40	023	15.90	26.9	2.00	2.00	50.70	10.70	3.90	1.10	3.50	0.70	480	0	0	4640	164.32	0.00	141.06	60.16	0.00
110041	2	910913	11:40	023	15.90	26.9	2.00	2.00	29.70	9.10	2.80	0.80	3.40	0.80	544	16	32	4240	92.14	2.22	106.06	286.18	0.00
110041	3	910913	11:40	023	15.90	26.9	2.00	2.00	61.70	18.50	4.10	0.80	2.60	0.50	384	0	0	2950	181.92	0.00	122.14	121.26	0.00
110041	4	910913	11:40	023	15.90	26.9	2.00	2.00	39.90	8.60	3.50	1.00	2.70	0.70	400	0	0	2688	207.33	0.00	119.78	0.00	0.00
110041	5	910913	11:40	023	15.90	26.9	2.00	2.00	59.60	10.00	4.20	0.60	3.30	0.80	288	0	0	3384	264.77	0.00	85.41	24.53	0.00
110041	6	910913	11:40	023	15.90	26.9	2.00	2.00	57.60	11.70	3.60	0.40	3.50	0.70	464	0	0	3107	121.52	0.00	85.36	119.78	0.00
110042	1	910916	13:30	003	15.00	29.5	2.00	0.00	104.30	36.60	3.60	0.60	3.70	0.90	480	48	144	5392	389.28	0.00	239.39	0.00	0.00
110042	2	910916	13:30	003	15.00	29.5	2.00	0.00	78.90	52.90	4.30	1.00	3.70	0.90	368	0	0	5536	316.53	0.00	254.66	13.06	0.00
110042	3	910916	13:30	003	15.00	29.5	2.00	0.00	131.10	50.70	5.00	0.90	4.10	0.60	288	0	0	6448	276.83	0.00	163.71	10.30	0.00
110042	4	910916	13:30	003	15.00	29.5	2.00	0.00	107.40	49.30	4.80	0.60	3.50	0.50	416	0	0	5248	282.32	0.00	211.49	18.37	0.00
110042	5	910916	13:30	003	15.00	29.5	2.00	0.00	95.90	30.90	4.50	0.70	3.40	0.70	432	0	0	5155	252.06	0.00	208.69	0.00	0.00
110042	6	910916	13:30	003	15.00	29.5	2.00	0.00	83.90	39.60	4.10	1.20	3.40	0.50	400	0	0	5296	239.73	0.00	140.00	0.00	0.00
110043	1	910917	13:50	009	16.10	32.0	2.50	1.00	113.70	15.50	5.30	1.00	4.50	0.60	64	0	0	768	281.92	0.00	27.81	0.00	0.00
110043	2	910917	13:50	009	16.10	32.0	2.50	1.00	154.20	53.60	5.40	0.60	4.50	0.50	416	16	64	2160	716.85	14.74	97.65	22.38	0.00
110043	3	910917	13:50	009	16.10	32.0	2.50	1.00	134.50	33.10	4.90	0.70	4.70	1.10	336	0	0	2608	765.55	0.00	84.40	0.00	0.00
110043	4	910917	13:50	009	16.10	32.0	2.50	1.00	159.70	39.30	5.20	0.80	4.10	0.60	288	64	304	2037	534.14	53.95	70.77	0.00	71.58
110043	5	910917	13:50	009	16.10	32.0	2.50	1.00	159.00	18.60	4.40	0.50	4.60	0.80	432	0	0	2768	1235.34	0.00	83.70	0.00	0.00
110043	6	910917	13:50	009	16.10	32.0	2.50	1.00	96.20	54.00	4.80	1.20	2.20	0.40	272	64	976	1904	510.06	118.51	127.06	24.74	0.00
110044	1	910917	14:30	019	15.70	32.0	2.20	2.00	113.90	34.60	4.30	0.50	3.50	0.70	464	0	0	5064	452.29	0.00	109.58	17.86	0.00
110044	2	910917	14:30	019	15.70	32.0	2.20	2.00	99.20	41.60	5.70	1.30	3.80	1.00	400	176	560	3200	354.80	77.89	108.35	0.00	0.00
110044	3	910917	14:30	019	15.70	32.0	2.20	2.00	114.40	23.50	5.00	0.20	3.60	0.80	192	0	0	4704	190.30	0.00	113.95	0.00	167.78
110044	4	910917	14:30	019	15.70	32.0	2.20	2.00	107.20	30.80	4.60	0.40	3.70	0.50	432	0	0	3168	293.41	0.00	113.94	41.73	19.20
110044	5	910917	14:30	019	15.70	32.0	2.20	2.00	82.00	27.90	4.40	0.60	3.30	0.70	448	0	0	8352	230.91	0.00	245.36	26.38	0.00
110044	6	910917	14:30	019	15.70	32.0	2.20	2.00	88.00	50.60	4.60	1.70	2.70	1.20	224	0	0	2288	337.41	0.00	78.69	0.00	0.00
110045	1	910920	14:45	001	16.10	28.5	0.30	0.00	48.80	5.40	2.90	0.40	3.80	0.90	1024	0	0	10720	273.20	0.00	210.10	10.70	0.00
110045	2	910920	14:45	001	16.10	28.5	0.30	0.00	46.20	11.00	2.90	0.70	3.10	0.90	1088	0	0	8640	274.72	0.00	181.81	0.00	0.00
110045	3	910920	14:45	001	16.10	28.5	0.30	0.00	42.20	4.90	2.80	0.50	4.50	0.70	1040	0	0	7440	176.27	0.00	142.45	112.70	0.00
110045	4	910920	14:45	001	16.10	28.5	0.30	0.00	42.40	8.00	2.90	0.40	4.20	0.80	480	16	64	3040	109.04	4.43	48.40	0.00	0.00

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EPAID	REP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	LENGTH	stdev	WIDTH	stdev	LEAF	stdev	DENS	REPROD	SPATHES	RHIZOME	VEGLEAF	FLOWER	ROOTRHIZ	DETRITUS	ALGAE
110045	5	910920	14:45	001	16.10	28.5	0.30	0.00	37.00	7.30	2.70	0.20	4.40	0.70	1488	0	0	10400	165.60	0.00	180.50	22.66	0.00
110045	6	910920	14:45	001	16.10	28.5	0.30	0.00	36.80	8.70	3.00	0.50	4.00	1.20	176	0	0	5200	65.25	0.00	99.44	21.68	0.00
110046	1	910920	16:00	002	14.20	30.0	1.00	11.00	92.90	24.90	4.10	0.90	3.70	0.50	192	0	0	3920	153.36	0.00	78.91	71.22	0.00
110046	2	910920	16:00	002	14.20	30.0	1.00	11.00	79.00	30.70	4.20	1.50	2.90	0.90	448	32	48	5632	183.60	2.86	168.51	0.00	10.82
110046	3	910920	16:00	002	14.20	30.0	1.00	11.00	90.30	16.00	5.10	0.70	4.70	0.50	496	0	0	8480	248.48	0.00	167.14	61.42	0.00
110046	4	910920	16:00	002	14.20	30.0	1.00	11.00	47.30	21.20	4.10	1.00	3.00	0.90	272	0	0	6624	152.53	0.00	137.09	0.00	0.00
110046	5	910920	16:00	002	14.20	30.0	1.00	11.00	107.00	31.80	4.80	0.50	3.20	0.40	304	0	0	7200	298.98	0.00	168.22	100.27	0.00
110046	6	910920	16:00	002	14.20	30.0	1.00	11.00	80.00	39.80	3.90	0.70	2.40	0.50	208	0	0	1872	188.18	0.00	69.97	0.00	0.00
110047	1	910924	08:05	011	15.10	27.1	1.50	1.50	78.40	16.10	4.10	0.40	3.70	0.50	112	0	0	4768	87.95	0.00	130.26	0.00	0.00
110047	2	910924	08:05	011	15.10	27.1	1.50	1.50	117.90	20.30	5.40	0.60	4.40	1.30	240	0	0	4285	336.18	0.00	249.90	19.70	206.90
110047	3	910924	08:05	011	15.10	27.1	1.50	1.50	97.40	25.40	4.50	0.50	4.30	0.50	176	0	0	2384	142.19	0.00	115.30	30.08	0.00
110047	4	910924	08:05	011	15.10	27.1	1.50	1.50	105.70	39.80	4.70	0.40	3.60	0.50	80	0	0	1712	195.98	0.00	79.62	0.00	0.00
110047	5	910924	08:05	011	15.10	27.1	1.50	1.50	106.60	19.60	4.80	0.50	4.40	0.50	144	0	0	3712	180.51	0.00	95.12	22.06	0.00
110047	6	910924	08:05	011	15.10	27.1	1.50	1.50	107.40	39.70	4.70	0.90	4.30	0.80	224	0	0	4240	259.66	0.00	124.13	0.00	0.00
110048	1	910924	09:10	016	15.20	26.5	2.00	2.50	157.20	30.80	4.10	0.60	4.30	0.80	496	0	0	6762	222.85	0.00	204.90	0.00	27.06
110048	2	910924	09:10	016	15.20	26.5	2.00	2.50	124.50	46.00	4.60	0.90	4.70	1.50	272	0	0	1600	342.69	0.00	86.08	30.59	16.03
110048	3	910924	09:10	016	15.20	26.5	2.00	2.50	165.90	35.20	5.50	0.70	5.10	1.30	656	0	0	4419	655.87	0.00	234.42	0.00	12.35
110048	4	910924	09:10	016	15.20	26.5	2.00	2.50	150.20	43.10	5.70	1.20	4.20	0.90	272	0	0	2048	401.54	0.00	128.13	0.00	0.00
110048	5	910924	09:10	016	15.20	26.5	2.00	2.50	174.60	9.50	5.50	0.30	4.40	0.50	416	0	0	3392	754.19	0.00	187.28	0.00	0.00
110048	6	910924	09:10	016	15.20	26.5	2.00	2.50	173.00	10.20	5.00	0.50	4.40	0.50	768	0	0	5616	756.80	0.00	370.27	0.00	5.12
110049	1	910924	10:10	015	14.80	27.5	3.00	3.50	63.10	17.30	4.20	1.00	3.50	0.60	192	0	0	4800	110.51	0.00	127.98	0.00	0.00
110049	2	910924	10:10	015	14.80	27.5	3.00	3.50	95.60	35.50	5.00	1.00	3.90	0.90	256	0	0	4800	205.38	0.00	107.12	90.37	7.71
110049	3	910924	10:10	015	14.80	27.5	3.00	3.50	106.40	31.50	4.80	0.90	3.60	0.80	240	0	0	1712	187.42	0.00	57.78	13.25	0.00
110049	4	910924	10:10	015	14.80	27.5	3.00	3.50	74.20	32.80	4.50	0.80	3.20	1.50	112	0	0	3227	254.67	0.00	128.58	36.96	8.99
110049	5	910924	10:10	015	14.80	27.5	3.00	3.50	63.60	26.40	3.90	0.80	3.90	0.60	272	0	0	5773	228.38	0.00	175.30	133.23	0.00
110049	6	910924	10:10	015	14.80	27.5	3.00	3.50	105.60	12.30	5.70	0.50	4.50	1.20	304	0	0	2674	225.57	0.00	68.66	0.00	0.00
110050	1	910930	12:10	018	13.30	21.9	1.50	2.00	88.30	44.30	4.20	0.70	4.10	0.70	352	0	0	2560	215.20	0.00	80.66	0.00	0.00
110050	2	910930	12:10	018	13.30	21.9	1.50	2.00	101.90	33.90	5.50	0.50	3.70	0.50	720	0	0	3392	344.53	0.00	102.67	0.00	0.00
110050	3	910930	12:10	018	13.30	21.9	1.50	2.00	112.00	31.70	5.50	1.10	3.30	1.00	160	0	0	432	428.78	0.00	11.18	3.23	0.00
110050	4	910930	12:10	018	13.30	21.9	1.50	2.00	133.20	29.60	5.40	0.80	4.10	0.90	592	0	0	2186	396.51	0.00	61.73	12.03	0.82
110050	5	910930	12:10	018	13.30	21.9	1.50	2.00	93.90	18.90	5.00	0.50	3.80	0.40	320	0	0	2434	261.28	0.00	87.25	6.11	3.90
110050	6	910930	12:10	018	13.30	21.9	1.50	2.00	112.80	28.80	5.30	0.80	4.70	0.50	544	0	0	4112	346.42	0.00	124.58	0.00	10.59
110051	1	910930	13:30	017	13.70	20.3	2.00	3.50	80.50	18.50	5.10	1.20	4.00	0.90	208	0	0	5888	192.66	0.00	147.60	0.00	0.00
110051	2	910930	13:30	017	13.70	20.3	2.00	3.50	74.30	16.70	6.10	1.20	4.40	0.50	256	0	0	4752	173.23	0.00	142.13	53.14	60.16
110051	3	910930	13:30	017	13.70	20.3	2.00	3.50	44.50	11.90	3.60	0.50	3.40	0.50	800	0	0	7792	99.97	0.00	184.70	50.00	0.00
110051	4	910930	13:30	017	13.70	20.3	2.00	3.50	73.00	25.20	6.40	0.60	3.70	0.60	64	0	0	3936	114.91	0.00	91.86	11.65	0.00
110051	5	910930	13:30	017	13.70	20.3	2.00	3.50	58.60	16.50	4.10	0.40	4.70	0.80	160	0	0	1080	87.54	0.00	37.86	0.00	0.00
110051	6	910930	13:30	017	13.70	20.3	2.00	3.50	62.90	15.60	5.00	0.00	4.20	0.80	128	0	0	432	95.98	0.00	15.12	0.00	0.00
110052	1	911002	13:30	014	13.40	22.4	0.50	1.00	50.30	3.80	3.80	0.20	3.50	0.40	416	0	0	3120	49.34	0.00	77.62	20.35	0.00

(Contd)

EPAID	REP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	LENGTH	stdev	WIDTH	stdev	LEAF	stdev	DENS	REPROD	SPATHES	RHIZOME	VEGLEAF	FLOWER	ROOTRHIZ	DETRITUS	ALGAE
110052	2	911002	13:30	014	13.40	22.4	0.50	1.00	84.60	14.70	4.70	0.80	3.10	1.00	1072	0	0	6400	188.16	0.00	280.72	106.93	0.00
110052	3	911002	13:30	014	13.40	22.4	0.50	1.00	29.00	9.60	3.00	0.30	3.30	0.50	304	0	0	6800	117.14	0.00	189.36	0.00	0.00
110052	4	911002	13:30	014	13.40	22.4	0.50	1.00	54.50	8.30	3.90	0.30	2.80	0.90	1712	0	0	5600	139.33	0.00	183.01	111.01	0.75
110052	5	911002	13:30	014	13.40	22.4	0.50	1.00	53.00	18.00	3.60	0.60	4.10	0.60	480	0	0	3600	118.06	0.00	182.00	0.00	0.00
110052	6	911002	13:30	014	13.40	22.4	0.50	1.00	59.70	16.90	4.70	0.70	2.30	0.50	352	0	0	1600	193.54	0.00	66.40	29.44	15.73
110037	1	911002	15:30	029	15.30	14.0	1.50	1.00	108.50	16.70	3.90	0.70	4.00	0.70	192	0	0	3100	84.78	0.00	52.45	11.18	0.00
110037	2	911002	15:30	029	15.30	14.0	1.50	1.00	127.90	26.60	4.50	0.60	4.80	0.60	384	0	0	3650	145.81	0.00	63.40	26.27	0.00
110037	3	911002	15:30	029	15.30	14.0	1.50	1.00	128.10	26.20	4.20	0.70	4.00	0.50	336	0	0	3250	180.50	0.00	60.15	5.74	0.00
110037	4	911002	15:30	029	15.30	14.0	1.50	1.00	74.60	9.90	3.70	0.60	3.60	0.70	256	16	64	3472	66.54	2.86	44.29	58.16	124.50
110037	5	911002	15:30	029	15.30	14.0	1.50	1.00	70.20	23.50	3.50	0.50	3.70	0.70	288	0	0		106.74	0.00	42.50	2.58	57.57
110037	6	911002	15:30	029	15.30	14.0	1.50	1.00	70.40	16.90	3.40	0.60	4.00	0.70	224	0	0	1368	98.91	0.00	18.77	0.00	7.30
110038	1	911002	16:30	033	14.30	16.0	2.00	2.00	66.30	9.00	3.10	0.50	4.90	0.70	480	48	240	14065	56.80	9.92	131.05	46.05	15.52
110038	2	911002	16:30	033	14.30	16.0	2.00	2.00	74.10	16.10	4.00	0.60	4.80	0.40	400	96	928	8800	104.00	66.46	79.70	7.10	0.00
110038	3	911002	16:30	033	14.30	16.0	2.00	2.00	102.60	36.30	4.50	1.30	4.20	1.60	736	0	0	4480	131.70	0.00	93.90	82.74	0.00
110038	4	911002	16:30	033	14.30	16.0	2.00	2.00	77.30	26.80	3.70	0.60	3.50	0.70	320	0	0	1726	130.19	0.00	46.75	0.00	0.00
110038	5	911002	16:30	033	14.30	16.0	2.00	2.00	92.20	22.10	4.30	0.80	3.50	1.10	384	0	0	6416	226.30	0.00	127.54	3.49	0.00
110376	1	920317	13:40	001	2.40	20.3	1.00		19.00	2.50	2.80	0.30	5.00	0.00	528	0	0	2016	33.31	0.00	30.38	16.99	3.98
110376	2	920317	13:40	001	2.40	20.3	1.00		19.90	1.50	3.10	0.30	5.30	1.00	368	0	0	1200	32.14	0.00	29.57	9.06	0.00
110376	3	920317	13:40	001	2.40	20.3	1.00		18.30	5.10	2.60	0.50	4.80	0.80	352	0	0	2145	24.50	0.00	26.70	8.00	0.00
110376	4	920317	13:40	001	2.40	20.3	1.00		17.20	2.20	2.80	0.30	5.50	0.60	352	0	0	936	16.51	0.00	11.95	8.83	0.00
110376	5	920317	13:40	001	2.40	20.3	1.00		17.80	2.80	2.80	0.20	5.00	0.50	768	0	0	310	15.44	0.00	35.70	5.66	0.00
110376	6	920317	13:40	001	2.40	20.3	1.00		20.10	6.90	2.80	0.30	5.00	0.00	160	0	0	712	12.29	0.00	16.32	9.71	0.00
110377	1	920325	13:50	023	3.00	29.0	3.00		29.40	8.30	3.40	0.50	5.00	0.90	288	0	0	9376	69.66	0.00	0.00	288.96	0.24
110377	2	920325	13:50	023	3.00	29.0	3.00								320				35.55			363.52	0.00
110377	3	920325	13:50	023	3.00	29.0	3.00								80				9.2			391.90	0.00
110377	4	920325	13:50	023	3.00	29.0	3.00								304				64.11			807.28	0.16
110377	5	920325	13:50	023	3.00	29.0	3.00								112				24.94			339.90	1.31
110377	6	920325	13:50	023	3.00	29.0	3.00								176				22.19			103.09	3.90
110378	1	920608	12:00	016	14.10	24.0	1.30		133.20	44.80	5.00	1.20	4.00	0.80	80	32	96	752	145.58	22.64	49.50	56.93	11.10
110378	2	920608	12:00	016	14.10	24.0	1.30		185.50	24.80	5.50	0.90	4.00	0.00	64	224	928	592	291.30	428.53	355.66	22.74	352.54
110378	3	920608	12:00	016	14.10	24.0	1.30		132.50	26.60	4.30	0.50	3.50	0.50	96	240	240	688	233.82	351.81	56.90	39.78	355.01
110378	4	920608	12:00	016	14.10	24.0	1.30		180.80	88.70	6.00	2.00	4.30	1.20	64	192	560	443	245.82	356.29	31.87	8.08	520.13
110378	5	920608	12:00	016	14.10	24.0	1.30		188.90	89.40	5.30	1.60	4.50	1.20	176	224	496	918	436.42	399.17	111.54	0.00	54.59
110378	6	920608	12:00	016	14.10	24.0	1.30		132.10	53.40	5.10	1.30	4.20	0.60	176	176	208	2046	404.64	212.53	92.13	0.00	392.70
110379	1	920608	14:00	001	17.10	28.5	1.30		19.00	4.60	4.00	0.50	6.20	1.80	416	240	464	1509	66.42	46.30	32.83	31.31	0.00
110379	2	920608	14:00	001	17.10	28.5	1.30		39.10	6.00	4.80	0.60	5.80	1.00	400	16	160	819	78.90	28.98	20.78	22.75	0.00
110379	3	920608	14:00	001	17.10	28.5	1.30		31.00	3.70	4.30	0.40	5.50	1.00	448	48	144	2352	132.82	27.01	50.43	33.68	0.00
110379	4	920608	14:00	001	17.10	28.5	1.30		37.40	3.70	4.40	0.40	5.90	1.40	496	96	256	1546	104.50	64.29	34.98	54.00	0.00
110379	5	920608	14:00	001	17.10	28.5	1.30		32.00	6.50	3.70	0.40	4.90	1.20	624	368	816	1925	77.18	132.02	40.37	36.75	0.00

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EPAID	REP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	LENGTH	stdev	WIDTH	stdev	LEAF	stdev	DENS	REPROD	SPATHES	RHIZOME	VEGLEAF	FLOWER	ROOTRHIZ	DETRITUS	ALGAE
110379	6	920608	14:00	001	17.10	28.5	1.30		26.30	3.70	4.30	0.40	5.40	0.70	640	32	272	2400	117.16	22.19	52.88	74.83	0.00
110380	1	920610	14:00	12A	13.60	26.0	1.30		89.90	34.60	7.10	1.50	5.50	1.40	192	32	64	912	305.06	32.66	36.94	80.61	0.00
110380	2	920610	14:00	12A	13.60	26.0	1.30		111.60	23.80	6.40	1.00	5.10	1.10	128	96	320	1328	198.05	163.46	51.60	45.41	48.19
110380	3	920610	14:00	12A	13.60	26.0	1.30		141.10	19.80	6.60	0.90	4.90	0.60	384	48	160	0	506.50	85.01	113.15	70.24	64.13
110380	4	920610	14:00	12A	13.60	26.0	1.30		109.20	25.40	6.10	1.30	5.90	1.00	272	80	208	2608	388.91	98.59	126.69	50.03	24.35
110380	5	920610	14:00	12A	13.60	26.0	1.30		129.80	34.90	6.60	0.90	6.20	0.90	304	32	144	1203	328.11	97.01	76.74	18.85	54.98
110380	6	920610	14:00	12A	13.60	26.0	1.30		139.50	28.50	6.70	0.80	6.20	0.80	576	96	304	2640	580.08	173.97	111.81	100.18	49.25
110381	1	920610	16:30	009	14.10	25.0	1.60		88.70	24.70	6.70	1.20	6.00	1.40	64	48	96	688	135.22	126.00	71.01	41.62	0.00
110381	2	920610	16:30	009	14.10	25.0	1.60		97.70	0.00	7.00	0.00	6.00	0.00	32	48	144	130	82.18	170.53	4.02	0.00	2.35
110381	3	920610	16:30	009	14.10	25.0	1.60		85.10	34.50	6.30	1.90	3.50	0.60	64	32	16	680	116.59	65.81	11.92	20.91	0.13
110381	4	920610	16:30	009	14.10	25.0	1.60		72.60	15.50	6.70	0.90	5.70	1.10	272	32	192	1056	231.09	149.65	44.40	68.99	0.00
110381	5	920610	16:30	009	14.10	25.0	1.60		87.90	8.60	5.80	0.30	5.20	0.80	288	80	384	1248	205.15	239.39	52.86	29.44	0.00
110381	6	920610	16:30	009	14.10	25.0	1.60		73.80	7.80	5.00	0.80	5.70	0.80	320	0	0	1016	175.89	0.00	20.78	18.26	0.72
110382	1	920611	15:00	017	13.80	27.0	1.50		96.60	9.50	6.10	0.60	5.90	0.70	816	0	0	3112	485.78	0.00	90.12	143.71	0.00
110382	2	920611	15:00	017	13.80	27.0	1.50		65.10	17.70	5.70	0.60	5.70	0.80	192	0	0	739	130.91	0.00	19.25	23.14	45.22
110382	3	920611	15:00	017	13.80	27.0	1.50		80.40	19.80	6.60	0.80	6.90	2.40	400	0	0	2408	366.51	0.00	107.97	140.29	0.00
110382	4	920611	15:00	017	13.80	27.0	1.50		48.10	7.80	5.80	0.60	5.10	0.90	368	48	80	1691	176.30	55.36	47.47	50.30	0.00
110382	5	920611	15:00	017	13.80	27.0	1.50		89.50	15.30	6.20	0.80	5.30	0.70	400	0	0	2664	343.22	0.00	63.41	24.24	0.00
110382	6	920611	15:00	017	13.80	27.0	1.50		67.60	18.80	6.10	2.10	5.00	0.90	304	32	32	1392	237.98	28.13	61.09	29.90	0.00
110383	1	920611	16:30	018	13.50	29.0	1.30		70.50	12.60	6.60	0.90	5.90	1.10	112	16	32	491	127.18	45.12	12.43	40.27	1.84
110383	2	920611	16:30	018	13.50	29.0	1.30		75.20	6.80	6.80	0.30	7.00	1.20	64	0	0	421	73.71	0.00	14.16	13.97	0.93
110383	3	920611	16:30	018	13.50	29.0	1.30		106.20	16.20	6.30	0.90	5.20	0.80	224	0	0	832	232.22	0.00	23.98	20.13	19.62
110383	4	920611	16:30	018	13.50	29.0	1.30		77.70	11.50	6.60	1.40	6.70	1.90	224	16	32	1110	222.29	35.78	31.79	51.26	0.00
110383	5	920611	16:30	018	13.50	29.0	1.30		90.20	22.70	5.20	0.90	5.20	0.40	208	32	0	944	153.10	48.59	20.05	29.47	21.89
110383	6	920611	16:30	018	13.50	29.0	1.30		117.10	21.40	6.50	1.20	4.80	0.80	480	80	0	2648	367.38	174.06	79.79	62.34	31.26
110384	1	920616	08:00	003	12.80	27.0	0.10		83.50	20.10	5.80	0.70	5.40	0.50	624	64	96	2752	442.27	72.67	132.83	168.05	415.44
110384	2	920616	08:00	003	12.80	27.0	0.10		98.70	23.90	4.80	0.70	4.70	0.90	288	32	0	1768	212.27	44.29	45.50	26.37	30.46
110384	3	920616	08:00	003	12.80	27.0	0.10		138.20	15.90	5.80	0.70	4.60	0.70	976	128	320	3184	522.21	179.38	133.62	107.31	23.76
110384	4	920616	08:00	003	12.80	27.0	0.10		68.50	30.70	5.20	0.90	4.70	0.60	48	112	208	296	70.93	129.50	9.63	16.18	0.00
110384	5	920616	08:00	003	12.80	27.0	0.10		129.10	14.00	5.80	0.70	4.60	0.80	240	32	64	624	184.03	37.94	24.03	38.13	11.55
110384	6	920616	08:00	003	12.80	27.0	0.10		116.40	22.90	5.20	0.60	3.90	0.60	256	96	352	1072	228.32	99.17	28.53	24.37	11.89
110385	1	920616	09:45	019	13.30	26.0	1.50		103.00	18.90	6.30	1.10	4.50	0.80	208	0	0	819	152.24	0.00	18.43	109.87	27.31
110385	2	920616	09:45	019	13.30	26.0	1.50		88.90	17.40	6.40	1.10	5.00	0.50	304	0	0	1491	390.35	0.00	48.94	184.50	58.90
110385	3	920616	09:45	019	13.30	26.0	1.50		106.20	9.20	7.10	0.60	4.50	0.50	192	16	48	1200	175.94	17.06	33.73	71.33	29.58
110385	4	920616	09:45	019	13.30	26.0	1.50		73.20	20.30	6.20	0.70	5.00	0.60	176	0	0	837	102.75	0.00	24.67	35.55	8.98
110385	5	920616	09:45	019	13.30	26.0	1.50		69.60	16.80	5.80	1.00	4.30	1.00	96	32	0	1459	72.34	28.86	26.94	72.50	65.95
110385	6	920616	09:45	019	13.30	26.0	1.50		71.30	24.20	5.20	0.90	5.20	0.80	288	144	16	4776	167.60	124.03	105.14	36.98	0.00
110386	1	920619	09:00	023	13.50	27.8	0.80		34.80	17.00	5.00	0.90	5.40	1.10	848	16	16	3270	311.25	8.72	103.54	298.72	0.00
110386	2	920619	09:00	023	13.50	27.8	0.80		34.40	6.90	4.40	0.50	4.40	0.80	496	32	176	3050	140.27	37.10	56.05	45.58	0.00

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EPAID	REP	DATE	TIME	STA	TEMP	SAL	DEPTH	TIDE	LENGTH	stdev	WIDTH	stdev	LEAF	stdev	DENS	REPROD	SPATHES	RHIZOME	VEGLEAF	FLOWER	ROOTRHIZ	DETRITUS	ALGAE
110386	3	920619	09:00	023	13.50	27.8	0.80		28.70	8.90	3.30	0.60	5.00	0.70	336	48	160	1371	77.20	25.34	30.83	25.17	0.00
110386	4	920619	09:00	023	13.50	27.8	0.80		24.60	8.80	4.10	0.40	4.70	1.10	304	32	64	1608	51.66	20.59	35.38	39.47	0.37
110386	5	920619	09:00	023	13.50	27.8	0.80		26.50	7.50	4.20	0.60	4.80	0.80	688	16	48	3429	170.80	15.82	90.85	357.25	4.91
110386	6	920619	09:00	023	13.50	27.8	0.80		25.90	6.30	4.10	0.60	4.80	0.80	288	32	80	1230	54.96	24.48	24.24	17.87	0.00

Appendix G
FUCOID COLLECTION AND ANALYSIS

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
QUADRAT	Replicate quadrat 1/16 m^2.
DATE	Collection date expressed as MMDDYY.
TIME	Collection time.
STA	University of New Hampshire station identifier.
TOTWETWT	Total wet weight (grams) per 1/16 m^2.
DRY250WET	Dry weight of 250 g of wet sample.
RATIO	Dry weight g / 250 g.
TOTDRYWT	Total dry weight (grams) per 1/16 m^2.

ALGAE DATA

EPAID	REP	QUADRAT	DATE	TIME	STA	TOTWETWT	DRY250WET	RATIO	TOTDRYWT
110142	A	1	091691	13:55	003	920.0	78.0	0.312	287.0
110142	A	2	091691	13:55	003	652.0	109.0	0.436	284.0
110142	A	3	091691	13:55	003	3516.0	64.0	0.256	99.0
110142	A	4	091691	13:55	003	4014.0	55.0	0.220	883.0
110142	A	5	091691	13:55	003	4358.0	70.0	0.280	1220.0
110142	A	6	091691	13:55	003	10085.0	66.0	0.264	2662.0
110143	A	1	091691	14:30	019	1101.0	65.0	0.260	286.0
110143	A	2	091691	14:30	019	3463.0	72.0	0.288	997.0
110143	A	3	091691	14:30	019	5229.0	66.0	0.264	1380.0
110143	A	4	091691	14:30	019	5905.0	61.0	0.244	1441.0
110143	A	5	091691	14:30	019	1432.0	72.0	0.288	412.0
110143	A	6	091691	14:30	019	6937.0	59.0	0.236	1637.0
110144	A	1	091891	12:30	009	2844.0	77.0	0.308	876.0
110144	A	2	091891	12:30	009	3545.0	64.0	0.256	908.0
110144	A	3	091891	12:30	009	6102.0	61.0	0.244	1489.0
110144	A	4	091891	12:30	009	411.0	72.0	0.288	188.0
110144	A	5	091891	12:30	009	3854.0	71.0	0.284	1095.0
110144	A	6	091891	12:30	009	8091.0	66.0	0.264	2136.0
110145	A	1	091891	13:00	008	2345.0	67.0	0.268	631.0
110145	A	2	091891	13:00	008	241.0	69.0	0.286	69.0
110145	A	3	091891	13:00	008	917.0	55.0	0.220	202.0
110145	A	4	091891	13:00	008	1366.0	72.0	0.288	393.0
110145	A	5	091891	13:00	008	1235.0	65.0	0.260	321.0
110145	A	6	091891	13:00	008	817.0	65.0	0.260	212.0
110146	A	1	091891	13:30	010	3279.0	58.0	0.232	761.0
110146	A	2	091891	13:30	010	1081.0	64.0	0.256	277.0
110146	A	3	091891	13:30	010	1857.0	53.0	0.212	394.0
110146	A	4	091891	13:30	010	451.0	62.0	0.248	112.0
110146	A	5	091891	13:30	010	925.0	63.0	0.252	233.0
110146	A	6	091891	13:30	010	547.0	37.0	0.148	81.0
110147	A	1	091891	14:00	017	3511.0	77.0	0.308	1081.0
110147	A	2	091891	14:00	017	796.0	94.0	0.376	299.0
110147	A	3	091891	14:00	017	754.0	94.0	0.376	284.0
110147	A	4	091891	14:00	017	1949.0	80.0	0.320	624.0
110147	A	5	091891	14:00	017	2550.0	62.0	0.248	632.0
110147	A	6	091891	14:00	017	5874.0	68.0	0.272	1598.0
110148	A	1	092791	08:30	10A	8432.0	69.0	0.286	2142.0
110148	A	2	092791	08:30	10A	3480.0	65.0	0.260	905.0
110148	A	3	092791	08:30	10A	728.0	68.0	0.272	198.0
110148	A	4	092791	08:30	10A	873.0	61.0	0.244	213.0
110148	A	5	092791	08:30	10A	2855.0	51.0	0.204	582.0
110148	A	6	092791	08:30	10A	3169.0	68.0	0.272	862.0
110149	A	1	092791	09:30	10A	1779.0	63.0	0.252	448.0
110149	A	2	092791	09:30	10A	299.0	71.0	0.284	85.0
110149	A	3	092791	09:30	10A	1323.0	70.0	0.280	370.0
110149	A	4	092791	09:30	10A	1377.0	73.0	0.292	402.0
110149	A	5	092791	09:30	10A	1232.0	60.0	0.240	296.0
110149	A	6	092791	09:30	10A	301.0	58.0	0.232	70.0
110141	A	1	100791	18:00	022	2240.0	65.0	0.260	582.0
110141	A	2	100791	18:00	022	2273.0	59.0	0.236	536.0
110141	A	3	100791	18:00	022	2717.0	72.0	0.288	782.0
110141	A	4	100791	18:00	022	2976.0	72.0	0.288	857.0
110141	A	5	100791	18:00	022	1196.0	75.0	0.300	359.0
110141	A	6	100791	18:00	022	703.0	74.0	0.296	208.0

Appendix H
FLOUNDER AND LOBSTER COLLECTION AND ANALYSIS

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
DUP	Duplicate sample identification within a replicate.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).
DEPTH	Depth in meters.
CLASS	Samples collected from each trawl were sorted into size classes. The *i*th class consisted of COUNT number of critters of size LENGTH for current species (SCODE) caught in the trawl.
SEX	"FOR LOBSTER ONLY" M=male, F=female, X=unknown, and blank = not recorded.
COUNT	Number of target species counted in a particular size class. The total number of "critters" caught is determined by the sum of COUNT(i,j,k) where i=1 to number of size classes, j=target species of interest, k=trawl of interest. Average length can be determined by, avg=[sum of (COUNT(i,j,k) × length(i,j,k))] / SUM of COUNT(i,j,k).
LENGTH	Lobsters: length in mm of the carapace, 0=not measurable (e.g. not complete carapace). Flounder: Total length in mm.

OTTERTRAWL DATA

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(A) Homarus americanus (specode=8474951)									
110150	1	910923	1	T2	2	1	M	1	43
110150	2	910923	1	T2	6	1	M	1	75
110150	2	910923	1	T2	6	2	M	1	66
110150	2	910923	1	T2	6	3	M	1	76
110150	2	910923	1	T2	6	4	M	1	68
110150	2	910923	1	T2	6	5	F	1	59
110150	2	910923	1	T2	6	6	M	1	62
110150	2	910923	1	T2	6	7	F	1	76
110150	3	910923	1	T2	6	1		0	66
110151	1	910925	1	T5	14	1	M	2	76
110151	1	910925	1	T5	14	2	M	1	82
110151	1	910925	1	T5	14	3	M	1	77
110151	1	910925	1	T5	14	4	F	1	70
110151	1	910925	1	T5	14	5	F	1	65
110151	1	910925	1	T5	14	6	M	1	66
110151	1	910925	1	T5	14	7	M	1	58
110151	1	910925	1	T5	14	8	F	1	57
110151	1	910925	1	T5	14	9	F	1	51
110151	1	910925	1	T5	14	10	M	1	55
110151	1	910925	1	T5	14	11	M	1	61
110151	1	910925	1	T5	14	12	M	4	56
110151	1	910925	1	T5	14	13	F	1	71
110151	1	910925	1	T5	14	14	M	2	53
110151	1	910925	1	T5	14	15	F	3	54
110151	1	910925	1	T5	14	16	M	1	47
110151	1	910925	1	T5	14	17	M	1	41
110151	1	910925	1	T5	14	18	M	1	48
110151	1	910925	1	T5	14	19	F	2	52
110151	1	910925	1	T5	14	20	M	2	42
110151	1	910925	1	T5	14	21	M	1	45
110151	1	910925	1	T5	14	22	M	1	43
110151	2	910925	3	T5	10	1		1	70
110151	2	910925	3	T5	10	2		1	73
110151	2	910925	3	T5	10	3		2	62
110151	2	910925	3	T5	10	4		2	60
110151	2	910925	3	T5	10	5		1	70
110151	2	910925	3	T5	10	6		1	74
110151	2	910925	3	T5	10	7		1	68
110151	2	910925	3	T5	10	8		2	72
110151	2	910925	3	T5	10	9		1	67
110151	2	910925	3	T5	10	10		1	77
110151	2	910925	3	T5	10	11		2	58
110151	2	910925	3	T5	10	12		2	61
110151	2	910925	3	T5	10	13		1	56
110151	2	910925	3	T5	10	14		2	63
110151	2	910925	3	T5	10	15		1	78
110151	2	910925	3	T5	10	16		1	50
110151	2	910925	3	T5	10	17		1	51
110151	2	910925	3	T5	10	18		1	65
110151	2	910925	3	T5	10	19		2	59
110151	2	910925	3	T5	10	20		1	47
110151	2	910925	3	T5	10	21	M	3	57

(Contd)

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(A) Homarus americanus (specode=8474951) cont.									
110151	2	910925	3	T5	10	22		2	53
110151	2	910925	3	T5	10	23		1	48
110151	2	910925	3	T5	10	24		1	49
110151	2	910925	3	T5	10	25		1	54
110151	2	910925	3	T5	10	26		1	43
110151	2	910925	3	T5	10	27		1	37
110151	2	910925	3	T5	10	28		1	41
110151	3	910925	4	T5	10	1		1	71
110151	3	910925	4	T5	10	2		2	68
110151	3	910925	4	T5	10	3		1	69
110151	3	910925	4	T5	10	4		1	64
110151	3	910925	4	T5	10	5		1	65
110151	3	910925	4	T5	10	6		1	73
110151	3	910925	4	T5	10	7		1	55
110151	3	910925	4	T5	10	8		4	48
110151	3	910925	4	T5	10	9		1	77
110151	3	910925	4	T5	10	10		1	53
110151	3	910925	4	T5	10	11		1	63
110151	3	910925	4	T5	10	12		1	46
110151	3	910925	4	T5	10	13		1	38
110151	3	910925	4	T5	10	14		1	37
110151	3	910925	4	T5	10	15		1	56
110151	3	910925	4	T5	10	16		6	40
110151	3	910925	4	T5	10	17		1	30
110151	3	910925	4	T5	10	18		3	47
110151	3	910925	4	T5	10	19		1	34
110151	3	910925	4	T5	10	20		1	44
110151	3	910925	4	T5	10	21		1	29
110152	1	910925	1	T7	4	1	F	1	70
110152	1	910925	1	T7	4	2	F	1	73
110152	1	910925	1	T7	4	3	M	1	68
110152	1	910925	1	T7	4	4	M	1	63
110152	1	910925	1	T7	4	5	M	1	72
110152	1	910925	1	T7	4	6	M	1	59
110152	1	910925	1	T7	4	7	M	1	50
110152	1	910925	1	T7	4	8	M	1	48
110152	2	910925	1	T7	4	1	M	1	43
110152	2	910925	1	T7	4	2	M	1	73
110152	2	910925	1	T7	4	3	M	1	54
110152	2	910925	1	T7	4	4	M	1	55
110152	3	910925	1	T7	4	1	M	1	43
110153	1	910925	1	T4	4	1	M	1	73
110153	1	910925	1	T4	4	2	M	1	66
110153	1	910925	1	T4	4	3	M	1	41
110153	2	910925	3	T4	6	1	M	1	75
110153	2	910925	3	T4	6	2	M	1	59
110153	2	910925	3	T4	6	3	F	1	48
110153	2	910925	3	T4	6	4	F	1	57
110153	2	910925	3	T4	6	5	M	1	43
110153	3	910925	3	T4	6	1	M	1	71
110153	3	910925	3	T4	6	2	M	1	63
110153	3	910925	3	T4	6	3	M	1	69
110153	3	910925	3	T4	6	4	F	1	46
110153	3	910925	3	T4	6	5	M	1	48

(Contd)

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(A) Homarus americanus (specode=8474951) cont.									
110154	1	910925	1	T9	4	1	M	1	67
110154	1	910925	1	T9	4	2	M	1	59
110154	1	910925	1	T9	4	3	M	1	58
110154	1	910925	1	T9	4	4	F	1	50
110154	1	910925	1	T9	4	5	M	1	46
110154	2	910925	1	T9	4	1	M	1	77
110154	2	910925	1	T9	4	2	M	1	52
110154	2	910925	1	T9	4	3	M	1	63
110154	2	910925	1	T9	4	4	M	1	57
110154	2	910925	1	T9	4	5	F	1	58
110154	2	910925	1	T9	4	6	M	1	57
110154	3	910925	1	T9	4	1	M	1	81
110154	3	910925	1	T9	4	2	F	1	67
110154	3	910925	1	T9	4	3	M	1	63
110154	3	910925	1	T9	4	4	M	1	49
110154	3	910925	1	T9	4	5	M	1	56
110154	3	910925	1	T9	4	6	M	1	60
110154	3	910925	1	T9	4	7	F	1	59
110155	1	910926	1	T6	11	1	M	1	80
110155	1	910926	1	T6	11	2	M	1	75
110155	1	910926	1	T6	11	3	M	1	74
110155	1	910926	1	T6	11	4	F	1	72
110155	1	910926	1	T6	11	5	M	1	66
110155	1	910926	1	T6	11	6	F	1	58
110155	1	910926	1	T6	11	7	M	1	51
110155	1	910926	1	T6	11	8	M	1	47
110155	1	910926	1	T6	11	9		2	48
110155	1	910926	1	T6	11	10		1	46
110155	1	910926	1	T6	11	11		1	39
110155	1	910926	1	T6	11	12		1	38
110155	1	910926	1	T6	11	13		1	47
110155	1	910926	1	T6	11	14		1	41
110155	1	910926	1	T6	11	15		1	39
110155	1	910926	1	T6	11	16		1	37
110155	2	910926	1	T6	11	1		1	65
110155	2	910926	1	T6	11	2		1	61
110155	2	910926	1	T6	11	3		2	56
110155	2	910926	1	T6	11	4		2	45
110155	2	910926	1	T6	11	5		1	42
110155	2	910926	1	T6	11	6		1	41
110155	3	910926	3	T6	12	1		1	81
110155	3	910926	3	T6	12	2		1	72
110155	3	910926	3	T6	12	3		1	59
110155	3	910926	3	T6	12	4		1	57
110155	3	910926	3	T6	12	5		1	49
110155	3	910926	3	T6	12	6		1	43
110155	3	910926	3	T6	12	7		1	40
110156	1	910926	3	T3	2	1	M	1	75
110156	1	910926	3	T3	2	2	M	1	61
110156	1	910926	3	T3	2	3	F	1	73
110156	1	910926	3	T3	2	4	F	1	64
110156	1	910926	3	T3	2	5	M	1	74
110156	1	910926	3	T3	2	6	M	1	48
110156	1	910926	3	T3	2	7	M	1	55

(Contd)

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(A) Homarus americanus (specode=8474951) cont.									
110156	1	910926	3	T3	2	8	M	1	46
110156	1	910926	3	T3	2	9	M	1	35
110156	2	910926	3	T3	3	1	F	1	55
110156	2	910926	3	T3	3	2	M	1	52
110156	2	910926	3	T3	3	3	F	1	46
110156	2	910926	3	T3	3	4	M	1	40
110156	2	910926	3	T3	3	5	M	1	47
110156	3	910926	3	T3	3	1	M	1	69
110156	3	910926	3	T3	3	2	M	1	32
110156	3	910926	3	T3	3	3	M	1	44
110156	3	910926	3	T3	3	4	M	1	46
110156	3	910926	3	T3	3	5	F	1	37
110156	3	910926	3	T3	3	6	F	1	49
110156	3	910926	3	T3	3	7	M	1	36
110157	1	910926	1	T8	14	1		2	75
110157	1	910926	1	T8	14	2		1	68
110157	1	910926	1	T8	14	3		1	64
110157	1	910926	1	T8	14	4		1	60
110157	1	910926	1	T8	14	5		1	46
110157	2	910926	1	T8	14	1		1	74
110157	2	910926	1	T8	14	2		1	85
110157	2	910926	1	T8	14	3		1	67
110157	2	910926	1	T8	14	4		2	60
110157	2	910926	1	T8	14	5		2	62
110157	2	910926	1	T8	14	6		2	61
110157	2	910926	1	T8	14	7		1	66
110157	2	910926	1	T8	14	8		1	73
110157	2	910926	1	T8	14	9		1	64
110157	2	910926	1	T8	14	10		1	65
110157	2	910926	1	T8	14	11		1	55
110157	2	910926	1	T8	14	12		1	67
110157	2	910926	1	T8	14	13		1	63
110157	2	910926	1	T8	14	14		1	56
110157	2	910926	1	T8	14	15		2	57
110157	2	910926	1	T8	14	16		2	51
110157	2	910926	1	T8	14	17		1	52
110157	2	910926	1	T8	14	18		1	49
110157	2	910926	1	T8	14	19		1	43
110157	2	910926	1	T8	14	20		1	35
110157	2	910926	1	T8	14	21		1	44
110157	2	910926	1	T8	14	22		1	30
110157	3	910926	1	T8	12	1	M	1	37
110158	1	910927	3	T1	8	1	F	1	97
110158	1	910927	3	T1	8	2	F	1	92
110158	1	910927	3	T1	8	3	F	3	71
110158	1	910927	3	T1	8	4	F	2	69
110158	1	910927	3	T1	8	5	F	1	73
110158	1	910927	3	T1	8	6	F	1	62
110158	1	910927	3	T1	8	7	M	1	73
110158	1	910927	3	T1	8	8	F	2	58
110158	1	910927	3	T1	8	9	M	1	53
110158	1	910927	3	T1	8	10	F	1	56
110158	1	910927	3	T1	8	11	M	1	43
110158	1	910927	3	T1	8	12	F	1	61

(Contd)

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(A) Homarus americanus (specode=8474951) cont.									
110158	1	910927	3	T1	8	13	F	3	66
110158	1	910927	3	T1	8	14	F	2	58
110158	1	910927	3	T1	8	15	M	1	63
110158	1	910927	3	T1	8	16	M	1	66
110158	1	910927	3	T1	8	17	M	1	54
110158	1	910927	3	T1	8	18	F	3	45
110158	1	910927	3	T1	8	19	F	4	40
110158	1	910927	3	T1	8	20	M	2	69
110158	1	910927	3	T1	8	21	M	2	44
110158	1	910927	3	T1	8	22	F	2	47
110158	1	910927	3	T1	8	23	M	1	46
110158	1	910927	3	T1	8	24	M	1	78
110158	1	910927	3	T1	8	25	M	3	61
110158	1	910927	3	T1	8	26	F	3	56
110158	1	910927	3	T1	8	27	M	1	70
110158	1	910927	3	T1	8	28	F	1	50
110158	1	910927	3	T1	8	29	F	2	64
110158	1	910927	3	T1	8	30	M	2	50
110158	1	910927	3	T1	8	31	F	1	32
110158	1	910927	3	T1	8	32	F	1	86
110158	1	910927	3	T1	8	33	M	2	38
110158	2	910927	1	T1	8	1	F	1	74
110158	2	910927	1	T1	8	2	F	1	86
110158	2	910927	1	T1	8	3	F	1	82
110158	2	910927	1	T1	8	4	M	2	71
110158	2	910927	1	T1	8	5	F	1	61
110158	2	910927	1	T1	8	6	M	2	63
110158	2	910927	1	T1	8	7	F	3	58
110158	2	910927	1	T1	8	8	M	2	53
110158	2	910927	1	T1	8	9	F	1	66
110158	2	910927	1	T1	8	10	M	2	61
110158	2	910927	1	T1	8	11	M	3	59
110158	2	910927	1	T1	8	12	M	1	51
110158	2	910927	1	T1	8	13	F	1	48
110158	2	910927	1	T1	8	14	M	2	57
110158	2	910927	1	T1	8	15	F	2	56
110158	2	910927	1	T1	8	16	M	1	47
110158	2	910927	1	T1	8	17	M	1	43
110158	3	910927	1	T1	8	1	F	1	66
110158	3	910927	1	T1	8	2	M	1	68
110158	3	910927	1	T1	8	3	M	3	56
110158	3	910927	1	T1	8	4	M	1	66
110158	3	910927	1	T1	8	5	F	1	63
110158	3	910927	1	T1	8	6	F	1	54
110158	3	910927	1	T1	8	7	F	1	68
110158	3	910927	1	T1	8	8	F	2	55
110158	3	910927	1	T1	8	9	M	1	61
110158	3	910927	1	T1	8	10	F	2	52
110158	3	910927	1	T1	8	11	F	1	58
110158	3	910927	1	T1	8	12	M	1	44
110158	3	910927	1	T1	8	13	F	1	43
110158	3	910927	1	T1	8	14	F	2	39
110158	3	910927	1	T1	8	15	M	2	34
110158	3	910927	1	T1	8	16	M	2	50

(Contd)

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(A) Homarus americanus (specode=8474951) cont.									
110158	3	910927	1	T1	8	17	M	1	31
110158	3	910927	1	T1	8	18	F	1	41
(B) Pseudopleuronectes americanus (specode=1371901)									
110180	1	910923	1	T2	2	1		0	
110180	2	910923	1	T2	6	1		2	
110180	3	910923	1	T2	6	1		11	
110181	1	910925	1	T5	14	1		0	
110181	2	910925	3	T5	10	1		1	135
110181	2	910925	3	T5	10	2		1	78
110181	2	910925	3	T5	10	3		1	84
110181	2	910925	3	T5	10	4		1	106
110181	2	910925	3	T5	10	5		1	64
110181	2	910925	3	T5	10	6		2	53
110181	2	910925	3	T5	10	7		2	57
110181	2	910925	3	T5	10	8		1	49
110181	2	910925	3	T5	10	9		1	67
110181	3	910925	4	T5	10	1		1	144
110181	3	910925	4	T5	10	2		1	63
110181	3	910925	4	T5	10	3		1	106
110181	3	910925	4	T5	10	4		1	110
110181	3	910925	4	T5	10	5		1	78
110181	3	910925	4	T5	10	6		1	76
110181	3	910925	4	T5	10	7		1	64
110181	3	910925	4	T5	10	8		1	61
110182	1	910925	1	T7	4	1		0	
110182	2	910925	1	T7	4	1		1	121
110182	3	910925	1	T7	4	1		0	
110183	1	910925	1	T4	4	1		0	
110183	2	910925	3	T4	6	1		1	172
110183	2	910925	3	T4	6	2		1	258
110183	2	910925	3	T4	6	3		1	166
110183	2	910925	3	T4	6	4		1	98
110183	2	910925	3	T4	6	5		1	161
110183	2	910925	3	T4	6	6		1	106
110183	2	910925	3	T4	6	7		1	65
110183	3	910925	3	T4	6	1		1	65
110183	3	910925	3	T4	6	2		1	69
110184	1	910925	1	T9	4	1		0	
110184	2	910925	1	T9	4	1		1	285
110184	2	910925	1	T9	4	2		1	289
110184	3	910925	1	T9	4	1		1	450
110184	3	910925	1	T9	4	2		1	277
110184	3	910925	1	T9	4	3		1	265
110184	3	910925	1	T9	4	4		1	132
110185	1	910926	1	T6	11	1		1	184
110185	1	910926	1	T6	11	2		1	149
110185	1	910926	1	T6	11	3		1	181
110185	2	910926	1	T6	11	1		1	196
110185	2	910926	1	T6	11	2		1	140
110185	2	910926	1	T6	11	3		1	79
110185	2	910926	1	T6	11	4		1	61
110185	3	910926	3	T6	12	1		1	152

(Contd)

EPAID	TRAWLREP	DATE	TIDE	STA	DEPTH	CLASS	SEX	COUNT	LENGTH
(B) Pseudopleuronectes americanus (specode=1371901) cont.									
110185	3	910926	3	T6	12	2		1	137
110185	3	910926	3	T6	12	3		1	150
110185	3	910926	3	T6	12	4		1	165
110185	3	910926	3	T6	12	5		1	146
110185	3	910926	3	T6	12	6		1	93
110185	3	910926	3	T6	12	7		1	110
110186	1	910926	3	T3	2	1		1	328
110186	2	910926	3	T3	3	1		1	337
110186	3	910926	3	T3	3	1		1	323
110186	3	910926	3	T3	3	2		1	80
110186	3	910926	3	T3	3	3		1	70
110186	3	910926	3	T3	3	4		1	77
110186	3	910926	3	T3	3	5		1	100
110186	3	910926	3	T3	3	6		1	82
110186	3	910926	3	T3	3	7		1	70
110186	3	910926	3	T3	3	8		1	74
110187	1	910926	1	T8	14	1		0	
110187	2	910926	1	T8	14	1		1	260
110187	2	910926	1	T8	14	2		1	112
110187	3	910926	1	T8	12	1		0	
110188	1	910927	3	T1	8	1		1	148
110188	2	910927	1	T1	8	1		1	282
110188	2	910927	1	T1	8	2		1	210
110188	3	910927	1	T1	8	1		1	81
110188	3	910927	1	T1	8	2		1	152

Appendix I
MUSSEL COLLECTION AND ANALYSIS

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
DUP	Duplicate sample identification within a replicate.
DATE	Collection date expressed as MMDDYY.
TIME	Collection time.
STA	University of New Hampshire station identifier.
TIDE	Tide.
TEMP	Temperature (°C).
SAL	Salinity (PPT).
LIVE	Live count.
se	SELIVE: Standard error of LIVE count.
DEAD	Dead count.
se	SEDEAD: Standard error of DEAD count.
WETVOL	Volume displaced.
se	SEWETVOL: Standard error of WETVOL.
LIVEDEAD	Ratio of LIVE to DEAD.
se	SELIVEDEAD: Standard error of LIVEDEAD.
LIVEVOL	Ratio of LIVE to VOL.
se	SELIVEVOL: Standard error of LIVEVOL.
LENGTH	Average mussel shell length (cm).
se	SELENGTH: Standard error of LENGTH.

MUSSEL database

EPAID	REP	DATE	TIME	STA	TIDE	TEMP	SAL	LIVE	se	DEAD	se	WETVOL	se	LIVEDEAD	se	LIVEVOL	se	LENGTH	se
(A) MUSSEL																			
110078	A	030584	07:45	019	0.00	14.5	27.0	32.10	7.58	8.70	3.97	366.67	91.00	8.46	2.87	0.10	0.01	4.52	0.25
110088	A	030596	07:30	022	1.00	8.9	26.5	156.70	20.46	117.40	24.37	605.00	62.23	1.84	0.48	0.23	0.03	3.32	0.16
110089	A	030596	09:00	023	2.00	10.6	27.3	36.70	6.88	40.00	8.11	440.00	103.56	0.94	0.21	0.10	0.01	4.70	0.30
110061	A	091091	08:00	028	11.00			58.30	7.53	30.80	8.72	607.50	78.18	2.93	0.57	0.10	0.01	4.71	0.19
110070	A	091291	07:30	017	1.00			29.30	15.04	22.20	3.71	263.50	124.17	1.32	0.60	0.15	0.04	4.45	0.19
110071	A	091291	08:00	020	11.50			39.30	10.54	23.00	5.89	429.17	86.70	1.77	0.21	0.08	0.01	4.51	0.24
110072	A	091291	08:25	021	0.00			69.40	5.03	39.50	5.78	337.50	35.60	1.99	0.25	0.21	0.01	3.45	0.14
110073	A	091691	12:00	001	0.00			40.30	12.71	10.20	2.50	433.33	128.88	3.98	0.98	0.10	0.01	4.59	0.29
110074	A	091691	12:45	014	0.00	15.0	29.5	95.50	15.90	32.80	7.13	921.88	214.82	4.04	1.03	0.14	0.02	3.43	0.25
110062	A	092091	17:20	027	0.00	15.3	24.0	91.10	14.77	30.20	10.65	410.00	61.37	8.02	2.38	0.21	0.02	3.78	0.19
110076	A	092391	07:15	011	1.50	15.3	26.3	31.40	12.16	21.30	6.54	272.22	109.25	0.80	0.28	0.12	0.01	4.06	0.22
110077	A	092391	08:00	016	2.00	15.6	26.0	51.00	10.75	29.10	4.57	500.00	108.78	2.21	0.51	0.10	0.01	3.83	0.28
110079	A	092791	08:15	10a	0.00	14.4	21.5	168.70	34.61	91.00	27.13	657.50	110.31	3.62	1.60	0.29	0.04	3.38	0.29
110080	A	093091	09:40	003	11.50	12.5	28.0	19.10	7.37	5.50	2.55	260.00	97.41	5.77	2.39	0.08	0.01	4.58	0.24
110081	A	093091	10:20	005	0.00	12.5	28.0	14.10	6.82	2.90	0.85	171.88	69.02	7.06	3.79	0.08	0.02	4.77	0.24
110082	A	093091	10:55	007	0.50	12.8	28.0	26.50	6.55	6.80	2.73	320.83	98.83	9.85	6.35	0.09	0.01	4.95	0.21
110083	A	093091	11:30	008	1.00	12.7	29.0												
110084	A	093091	11:55	009	1.50	13.6	26.0	114.50	3.50	6.50	0.50	1012.50	12.50	17.68	0.82	0.11	0.01	4.59	0.17
110063	A	093091	13:00	025	1.00	13.8	18.0	53.90	14.25	33.70	9.10	302.78	64.61	1.95	0.40	0.15	0.02	3.98	0.19
110075	A	100191	11:45	002	0.50	23.3	28.0	27.90	5.95	6.10	1.69	286.11	80.05	6.00	1.56	0.13	0.02	4.15	0.22
110064	A	100191	12:45	024	0.50	12.9	20.3	15.00	5.23	7.40	2.64	196.88	61.32	1.66	0.55	0.08	0.02	4.38	0.20
110085	A	100391	12:05	006	10.00	12.7	27.5	16.60	7.72	5.50	2.17	232.00	100.86	4.26	2.09	0.07	0.01	4.52	0.21
110086	A	100391	13:00	004	11.00	12.9	27.0	10.00	3.00	6.10	2.23	171.11	62.20	2.21	1.13	0.10	0.03	4.06	0.22
110087	A	100391	13:30	018	11.50	12.3	27.5	35.80	11.27	3.60	1.44	421.00	156.06	11.32	1.86	0.10	0.01	4.45	0.24
110090	A	102291	15:45	010	11.00														
110091	A	102291	16:30	012	11.50														
110092	A	102291	16:50	12a	0.00														
(B) OYSTER																			
110065	A	100491	15:10	031	9.50	16.3	17.0												
110066	A	100491	15:25	029	10.00	15.9	16.0												
110061	B	101091	09:45	028	1.00	13.2	12.0												
(C) BOTH																			
110060	C	101091	08:50	026	11.00	10.6	27.3												

Appendix J
MUSSEL DEPLOYMENT

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
SFGNUM	Identification number assigned for the assay.
SFGREP	Replicate number (or letter) for each station.
DATE	Lab date.
STA	University of New Hampshire station identifier (from CUSTODY database).
AVGCLR	Average clearance rate (L/hr).
ABSEFF	Absorbance efficiency (%).
MLO2HR	Respiration (ml O_2/hr).
JSFG	Scope for growth number (Joules SFG/hr).

SCOPE FOR GROWTH

EPAID	REP	SFGNUM	SFGREP	DATE	STA	AVGCLR	ABSEFF	MLO2HR	JSFG
798951	A	5161	1	911023	2	5.24674	89	0.72611	10.00936
798951	A	5162	1	911023	2	2.00734	89	0.34724	5.79208
798952	A	5163	2	911023	2	2.98996	85	0.65378	4.37859
798952	A	5164	2	911023	2	3.14321	85	0.64747	4.59177
798953	A	5165	3	911023	2	5.08953	84	0.69033	9.09925
798953	A	5166	3	911023	2	7.77462	84	0.83652	10.65029
798954	A	5167	4	911023	2	4.50884	88	0.74899	7.58871
798954	A	5168	4	911023	2	7.56798	88	0.76771	11.22664
798955	A	5171	1	911023	8	3.33731	90	0.80667	3.39842
798955	A	5172	1	911023	8	6.05029	90	1.02490	6.05623
798956	A	5173	2	911023	8	5.33065	82	0.81060	6.21174
798956	A	5174	2	911023	8	5.74236	82	0.86134	6.35247
798957	A	5175	3	911023	8	18.82088	84	0.93398	13.16057
798957	A	5176	3	911023	8	4.24803	84	0.48684	7.71700
798958	A	5177	4	911023	8	7.71407	87	0.51493	16.73805
798958	A	5178	4	911023	8	3.33625	87	0.56445	6.47458
798963	A	5181	1	911023	15	8.98089	87	0.46699	20.35706
798963	A	5182	1	911023	15	5.41355	87	0.34473	9.08766
798964	A	5183	2	911023	15	8.38833	83	0.56174	15.68280
798964	A	5184	2	911023	15	10.11222	83	0.72437	13.33892
798965	A	5185	3	911023	15	7.31788	80	0.15801	12.27321
798965	A	5186	3	911023	15	9.76464	80	0.70048	12.23259
798966	A	5187	4	911023	15	11.50226	90	0.54820	21.16243
798966	A	5188	4	911023	15	2.74836	90	0.60855	2.71191
798967	A	5191	1	911023	19	46.44726	84	0.74718	19.21509
798967	A	5192	1	911023	19	4.65200	84	0.70048	7.36042
798968	A	5193	2	911023	19	5.15963	86	0.73996	8.66061
798968	A	5194	2	911023	19	4.31325	86	0.85303	1.37836
798969	A	5195	3	911023	19	6.22238	89	0.73996	10.71176
798969	A	5196	3	911023	19	5.20247	89	0.98246	4.88921
798970	A	5197	4	911023	19	5.08501	84	0.74357	7.32232
798970	A	5198	4	911023	19	4.86883	84	0.90158	4.23051
798971	A	5201	1	911023	22	3.71987	85	0.62879	6.68638
798971	A	5202	1	911023	22	5.53823	85	0.72785	9.55115
798972	A	5203	2	911023	22	4.81363	81	0.91593	3.14954
798972	A	5204	2	911023	22	5.54937	81	1.03848	2.21975
798973	A	5205	3	911023	22	3.39570	90	0.74718	4.89720
798973	A	5206	3	911023	22	3.87495	90	0.76401	6.14208
798974	A	5207	4	911023	22	5.20249	87	0.89502	6.08902
798974	A	5208	4	911023	22	6.87965	87	0.73996	12.06028

Appendix K
INFAUNAL INVERTEBRATE ASSESSMENT

VARIABLE LIST

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
GRAB	Duplicate sample identification within a replicate.
DATE	Collection date expressed as MM/DD/YY.
STA	University of New Hampshire station identifier (from CUSTODY database).
NAIID	Internal NAI ID number.
SAMP	SAMPTYPE: SG=sediment grab.
SPECIES	Species name. Genus species or lowest Taxa identified.
SPECODE	Tax code used by NAI.
TYPE	Type of unit. N=individual. C=colonial.
NUM	NUMBER: Quantity of units counted, colonies not included.
DENS	DENSITY: Density of units per m^2, colonies not included.

BENTHIC DATA

EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110210	1	1	09/09/91	19	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110210	1	1	09/09/91	19	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110210	1	1	09/09/91	19	12918	SG	ANAITIDES MACULATA	5001130106	N	1	25
110210	1	1	09/09/91	19	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	8	200
110210	1	1	09/09/91	19	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110210	1	1	09/09/91	19	12918	SG	CAPITELLA CAPITATA	5001600101	N	69	1725
110210	1	1	09/09/91	19	12918	SG	CARCINUS MAENAS	6189010701	N	1	25
110210	1	1	09/09/91	19	12918	SG	DEXAMINE THEA	6169170401	N	1	25
110210	1	1	09/09/91	19	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110210	1	1	09/09/91	19	12918	SG	HARMOTHOE SP.	5001020899	N	3	75
110210	1	1	09/09/91	19	12918	SG	HIATELLA SP.	5517060299	N	1	25
110210	1	1	09/09/91	19	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110210	1	1	09/09/91	19	12918	SG	MEDIOMASTUS SP.	5001600499	N	4	100
110210	1	1	09/09/91	19	12918	SG	MYTILIDAE	5507010000	N	44	1100
110210	1	1	09/09/91	19	12918	SG	MYTILUS EDULIS	5507010101	N	3	75
110210	1	1	09/09/91	19	12918	SG	NEANTHES VIRENS	5001240302	N	3	75
110210	1	1	09/09/91	19	12918	SG	NINOE NIGRIPES	5001310204	N	5	125
110210	1	1	09/09/91	19	12918	SG	OLIGOCHAETA	5004000000	N	549	13725
110210	1	1	09/09/91	19	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	1	25
110210	1	1	09/09/91	19	12918	SG	PHOLOE MINUTA	5001060101	N	3	75
110210	1	1	09/09/91	19	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	34	850
110210	1	1	09/09/91	19	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110210	1	1	09/09/91	19	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110210	1	1	09/09/91	19	12918	SG	SCOLETOMA SP.	5001319899	N	25	625
110210	1	1	09/09/91	19	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	129	3225
110210	1	1	09/09/91	19	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110210	1	1	09/09/91	19	12918	SG	TELLINA AGILIS	5515310205	N	7	175
110210	2	2	09/09/91	19	12918	SG	AMPELISCA ABDITA	6169020108	N	2	50
110210	2	2	09/09/91	19	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110210	2	2	09/09/91	19	12918	SG	AMPHARETE ARCTICA	5001670201	N	1	25
110210	2	2	09/09/91	19	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110210	2	2	09/09/91	19	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110210	2	2	09/09/91	19	12918	SG	BIVALVIA	55	N	1	25
110210	2	2	09/09/91	19	12918	SG	CAPITELLA CAPITATA	5001600101	N	3	75
110210	2	2	09/09/91	19	12918	SG	CARCINUS MAENAS	6189010701	N	2	50
110210	2	2	09/09/91	19	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	2	50
110210	2	2	09/09/91	19	12918	SG	CIRRATULIDAE	5001500000	N	48	1200
110210	2	2	09/09/91	19	12918	SG	CIRRATULUS GRANDIS	5001500104	N	1	25
110210	2	2	09/09/91	19	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110210	2	2	09/09/91	19	12918	SG	DEXAMINE THEA	6169170401	N	5	125
110210	2	2	09/09/91	19	12918	SG	EULALIA VIRIDIS	5001130301	N	1	25
110210	2	2	09/09/91	19	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110210	2	2	09/09/91	19	12918	SG	HIATELLA SP.	5517060299	N	2	50
110210	2	2	09/09/91	19	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110210	2	2	09/09/91	19	12918	SG	LACUNA VINCTA	5103090305	N	1	25
110210	2	2	09/09/91	19	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110210	2	2	09/09/91	19	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	2	50
110210	2	2	09/09/91	19	12918	SG	MALDANIDAE	500163	N	1	25
110210	2	2	09/09/91	19	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110210	2	2	09/09/91	19	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110210	2	2	09/09/91	19	12918	SG	MYTILIDAE	5507010000	N	30	750
110210	2	2	09/09/91	19	12918	SG	NEPHTYIDAE	5001250000	N	13	325
110210	2	2	09/09/91	19	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110210	2	2	09/09/91	19	12918	SG	OLIGOCHAETA	5004000000	N	547	13675
110210	2	2	09/09/91	19	12918	SG	PHOLOE MINUTA	5001060101	N	9	225
110210	2	2	09/09/91	19	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	28	700
110210	2	2	09/09/91	19	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110210	2	2	09/09/91	19	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110210	2	2	09/09/91	19	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110210	2	2	09/09/91	19	12918	SG	PYGOSPIO ELEGANS	5001431302	N	5	125
110210	2	2	09/09/91	19	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110210	2	2	09/09/91	19	12918	SG	SCOLETOMA HEBES	5001319898	N	57	1425
110210	2	2	09/09/91	19	12918	SG	SCOLETOMA SP.	5001319899	N	44	1100
110210	2	2	09/09/91	19	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	736	18400
110210	2	2	09/09/91	19	12918	SG	TELLINA AGILIS	5515310205	N	10	250
110210	3	3	09/09/91	19	12918	SG	AMPELISCA ABDITA	6169020108	N	19	475
110210	3	3	09/09/91	19	12918	SG	AMPELISCA SP.	6169020199	N	75	1875
110210	3	3	09/09/91	19	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110210	3	3	09/09/91	19	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	12	300
110210	3	3	09/09/91	19	12918	SG	CIRRATULIDAE	5001500000	N	15	375
110210	3	3	09/09/91	19	12918	SG	DEXAMINE THEA	6169170401	N	1	25
110210	3	3	09/09/91	19	12918	SG	ETEONE LONGA	5001130205	N	2	50
110210	3	3	09/09/91	19	12918	SG	ETEONE SP.	5001130299	N	1	25
110210	3	3	09/09/91	19	12918	SG	GLYCERA DIBRANCHIATA	5001270105	N	1	25
110210	3	3	09/09/91	19	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110210	3	3	09/09/91	19	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110210	3	3	09/09/91	19	12918	SG	LEUCON AMERICANUS	6154040110	N	1	25
110210	3	3	09/09/91	19	12918	SG	MEDIOMASTUS SP.	5001600499	N	33	825
110210	3	3	09/09/91	19	12918	SG	MYTILIDAE	5507010000	N	14	350
110210	3	3	09/09/91	19	12918	SG	NEPHTYIDAE	5001250000	N	16	400
110210	3	3	09/09/91	19	12918	SG	NEREIDAE	500124	N	1	25
110210	3	3	09/09/91	19	12918	SG	NINOE NIGRIPES	5001310204	N	5	125
110210	3	3	09/09/91	19	12918	SG	OLIGOCHAETA	5004000000	N	983	24575
110210	3	3	09/09/91	19	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	2	50
110210	3	3	09/09/91	19	12918	SG	PHOLOE MINUTA	5001060101	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110210	3	3	09/09/91	19	12918	SG	PHOTIS MACROCOXA	6169260208	N	17	425
110210	3	3	09/09/91	19	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	171	4275
110210	3	3	09/09/91	19	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110210	3	3	09/09/91	19	12918	SG	PRIONOSPIO SP.	5001430599	N	4	100
110210	3	3	09/09/91	19	12918	SG	PYGOSPIO ELEGANS	5001431302	N	16	400
110210	3	3	09/09/91	19	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110210	3	3	09/09/91	19	12918	SG	SCOLETOMA HEBES	5001319898	N	66	1650
110210	3	3	09/09/91	19	12918	SG	SCOLETOMA SP.	5001319899	N	173	4325
110210	3	3	09/09/91	19	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3439	85975
110210	3	3	09/09/91	19	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110210	3	3	09/09/91	19	12918	SG	TURBELLARIA	3901000000	N	1	25
110210	3	3	09/09/91	19	12918	SG	UNCIOLA SP.	6169150799	N	1	25
110210	4	4	09/09/91	19	12918	SG	AMPELISCA ABDITA	6169020108	N	8	200
110210	4	4	09/09/91	19	12918	SG	AMPELISCA SP.	6169020199	N	40	1000
110210	4	4	09/09/91	19	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	5	125
110210	4	4	09/09/91	19	12918	SG	BIVALVIA	55	N	1	25
110210	4	4	09/09/91	19	12918	SG	CARCINUS MAENAS	6189010701	N	1	25
110210	4	4	09/09/91	19	12918	SG	CIRRATULIDAE	5001500000	N	23	575
110210	4	4	09/09/91	19	12918	SG	DYNAMENA PUMILA	3704050697	C		
110210	4	4	09/09/91	19	12918	SG	EDWARDSIA ELEGANS	3759010101	N	1	25
110210	4	4	09/09/91	19	12918	SG	ETEONE SP.	5001130299	N	3	75
110210	4	4	09/09/91	19	12918	SG	GLYCERA DIBRANCHIATA	5001270105	N	1	25
110210	4	4	09/09/91	19	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110210	4	4	09/09/91	19	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	3	75
110210	4	4	09/09/91	19	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110210	4	4	09/09/91	19	12918	SG	MEDIOMASTUS SP.	5001600499	N	21	525
110210	4	4	09/09/91	19	12918	SG	MYTILIDAE	5507010000	N	2	50
110210	4	4	09/09/91	19	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110210	4	4	09/09/91	19	12918	SG	NEPHTYIDAE	5001250000	N	22	550
110210	4	4	09/09/91	19	12918	SG	NEPHTYS INCISA	5001250115	N	2	50
110210	4	4	09/09/91	19	12918	SG	NEREIDAE	500124	N	2	50
110210	4	4	09/09/91	19	12918	SG	NINOE NIGRIPES	5001310204	N	16	400
110210	4	4	09/09/91	19	12918	SG	OBELIA GENICULATA	3704010298	C		
110210	4	4	09/09/91	19	12918	SG	OLIGOCHAETA	5004000000	N	972	24300
110210	4	4	09/09/91	19	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110210	4	4	09/09/91	19	12918	SG	PHORONIS SP.	7700010299	N	1	25
110210	4	4	09/09/91	19	12918	SG	PHOTIS MACROCOXA	6169260208	N	1	25
110210	4	4	09/09/91	19	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	193	4825
110210	4	4	09/09/91	19	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110210	4	4	09/09/91	19	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110210	4	4	09/09/91	19	12918	SG	PYGOSPIO ELEGANS	5001431302	N	133	3325
110210	4	4	09/09/91	19	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110210	4	4	09/09/91	19	12918	SG	SCOLETOMA HEBES	5001319898	N	61	1525
110210	4	4	09/09/91	19	12918	SG	SCOLETOMA SP.	5001319899	N	96	2400
110210	4	4	09/09/91	19	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1582	39550
110210	4	4	09/09/91	19	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110210	4	4	09/09/91	19	12918	SG	TRICELLARIA PEACHII	7815280398	C		
110211	1	1	09/09/91	18	12918	SG	ACMAEA TESTUDINALIS	5102050108	N	3	75
110211	1	1	09/09/91	18	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110211	1	1	09/09/91	18	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110211	1	1	09/09/91	18	12918	SG	AMPHIPHOLIS SQUAMATA	8129030202	N	2	50
110211	1	1	09/09/91	18	12918	SG	ANOMIA SP.	5509090299	N	74	1850
110211	1	1	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	51	1275
110211	1	1	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	6	150
110211	1	1	09/09/91	18	12918	SG	CALYCELLA SYRINGA	3704019898	C		
110211	1	1	09/09/91	18	12918	SG	CANCER IRRORATUS	6188030108	N	1	25
110211	1	1	09/09/91	18	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110211	1	1	09/09/91	18	12918	SG	CIRRATULIDAE	5001500000	N	36	900
110211	1	1	09/09/91	18	12918	SG	CIRRATULUS GRANDIS	5001500104	N	56	1400
110211	1	1	09/09/91	18	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	4	100
110211	1	1	09/09/91	18	12918	SG	COROPHIUM SP.	6169150299	N	12	300
110211	1	1	09/09/91	18	12918	SG	CRENELLA SP.	5507010299	N	1	25
110211	1	1	09/09/91	18	12918	SG	CREPIDULA SP.	5103640299	N	4	100
110211	1	1	09/09/91	18	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110211	1	1	09/09/91	18	12918	SG	DEXAMINE THEA	6169170401	N	2	50
110211	1	1	09/09/91	18	12918	SG	ETEONE LONGA	5001130205	N	1	25
110211	1	1	09/09/91	18	12918	SG	ETEONE SP.	5001130299	N	2	50
110211	1	1	09/09/91	18	12918	SG	EUCLYMENE ZONALIS	5001631103	N	1	25
110211	1	1	09/09/91	18	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110211	1	1	09/09/91	18	12918	SG	GASTROPODA	51	N	5	125
110211	1	1	09/09/91	18	12918	SG	HALECIUM DIMINUTIVUM	3704060198	C		
110211	1	1	09/09/91	18	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110211	1	1	09/09/91	18	12918	SG	HIATELLA SP.	5517060299	N	1	25
110211	1	1	09/09/91	18	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110211	1	1	09/09/91	18	12918	SG	LEPTOGNATHA CAECA	6157020201	N	5	125
110211	1	1	09/09/91	18	12918	SG	LITTORINA LITTOREA	5103100108	N	5	125
110211	1	1	09/09/91	18	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110211	1	1	09/09/91	18	12918	SG	LYONSIA SP.	5520050299	N	2	50
110211	1	1	09/09/91	18	12918	SG	MALDANIDAE	500163	N	1	25
110211	1	1	09/09/91	18	12918	SG	MEDIOMASTUS SP.	5001600499	N	7	175
110211	1	1	09/09/91	18	12918	SG	MYTILIDAE	5507010000	N	106	2650
110211	1	1	09/09/91	18	12918	SG	NEPHTYS CAECA	5001250103	N	1	25
110211	1	1	09/09/91	18	12918	SG	NUCULA DELPHINODONTA	5502020206	N	1	25
110211	1	1	09/09/91	18	12918	SG	OBELIA DICHOTOMA	3704010205	C		
110211	1	1	09/09/91	18	12918	SG	OLIGOCHAETA	5004000000	N	252	6300
110211	1	1	09/09/91	18	12918	SG	OPHIUROIDEA	8120	N	8	200
110211	1	1	09/09/91	18	12918	SG	PHOLOE MINUTA	5001060101	N	21	525

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110211	1	1	09/09/91	18	12918	SG	PHOXICHILIDIUM FEMORATUM	6001060102	N	1	25
110211	1	1	09/09/91	18	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	17	425
110211	1	1	09/09/91	18	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	5	125
110211	1	1	09/09/91	18	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110211	1	1	09/09/91	18	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110211	1	1	09/09/91	18	12918	SG	PROTODORVILLEA SP.	5001360299	N	4	100
110211	1	1	09/09/91	18	12918	SG	RHYNCHOCOELA	4300000000	N	28	700
110211	1	1	09/09/91	18	12918	SG	SCOLETOMA SP.	5001319899	N	4	100
110211	1	1	09/09/91	18	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110211	1	1	09/09/91	18	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110211	1	1	09/09/91	18	12918	SG	SYLLIDAE	500123	N	8	200
110211	1	1	09/09/91	18	12918	SG	SYLLIS SP.	5001230399	N	1	25
110211	1	1	09/09/91	18	12918	SG	TELLINA AGILIS	5515310205	N	3	75
110211	1	1	09/09/91	18	12918	SG	TEREBELLIDAE	500168	N	1	25
110211	1	1	09/09/91	18	12918	SG	TURBELLARIA	3901000000	N	1	25
110211	1	1	09/09/91	18	12918	SG	UNCIOLAIRRORATA	6169150703	N	3	75
110211	1	1	09/09/91	18	12918	SG	UNCIOLA SP.	6169150799	N	4	100
110211	2	2	09/09/91	18	12918	SG	ACMAEA TESTUDINALIS	5102050108	N	5	125
110211	2	2	09/09/91	18	12918	SG	ALVANIA SP.	5103200199	N	8	200
110211	2	2	09/09/91	18	12918	SG	AMPHIPHOLIS SQUAMATA	8129030202	N	32	800
110211	2	2	09/09/91	18	12918	SG	ANOMIA SP.	5509090299	N	1	25
110211	2	2	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110211	2	2	09/09/91	18	12918	SG	BALANUS CRENATUS	6134020104	N	1	25
110211	2	2	09/09/91	18	12918	SG	CALLOPORA AURITA	7815080101	C		
110211	2	2	09/09/91	18	12918	SG	CANCER IRRORATUS	6188030108	N	1	25
110211	2	2	09/09/91	18	12918	SG	CANCER SP.	6188030199	N	1	25
110211	2	2	09/09/91	18	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110211	2	2	09/09/91	18	12918	SG	CAPRELLIDAE	617101	N	2	50
110211	2	2	09/09/91	18	12918	SG	CIRRATULIDAE	5001500000	N	10	250
110211	2	2	09/09/91	18	12918	SG	CIRRATULUS GRANDIS	5001500104	N	23	575
110211	2	2	09/09/91	18	12918	SG	CIRRIPEDIA	6130	N	1	25
110211	2	2	09/09/91	18	12918	SG	CISTENIDES GRANULATA	5001660202	N	3	75
110211	2	2	09/09/91	18	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110211	2	2	09/09/91	18	12918	SG	COROPHIUM BONELLI	6169150202	N	1	25
110211	2	2	09/09/91	18	12918	SG	COROPHIUM SP.	6169150299	N	7	175
110211	2	2	09/09/91	18	12918	SG	CRENELLA GLANDULA	5507010203	N	1	25
110211	2	2	09/09/91	18	12918	SG	CRENELLA SP.	5507010299	N	2	50
110211	2	2	09/09/91	18	12918	SG	CREPIDULA SP.	5103640299	N	3	75
110211	2	2	09/09/91	18	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110211	2	2	09/09/91	18	12918	SG	DENDROBEANIA MURRAYANA	7815250201	C		
110211	2	2	09/09/91	18	12918	SG	DEXAMINE THEA	6169170401	N	2	50
110211	2	2	09/09/91	18	12918	SG	ELECTRA PILOSA	7815050103	C		
110211	2	2	09/09/91	18	12918	SG	EULALIA VIRIDIS	5001130301	N	1	25
110211	2	2	09/09/91	18	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110211	2	2	09/09/91	18	12918	SG	GASTROPODA	51	N	12	300
110211	2	2	09/09/91	18	12918	SG	HALECIUM DIMINUTIVUM	3704060198	C		
110211	2	2	09/09/91	18	12918	SG	HARMOTHOE EXTENUATA	5001020803	N	2	50
110211	2	2	09/09/91	18	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110211	2	2	09/09/91	18	12918	SG	HARMOTHOE SP.	5001020899	N	2	50
110211	2	2	09/09/91	18	12918	SG	HIATELLA SP.	5517060299	N	18	450
110211	2	2	09/09/91	18	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110211	2	2	09/09/91	18	12918	SG	LACUNA VINCTA	5103090305	N	2	50
110211	2	2	09/09/91	18	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110211	2	2	09/09/91	18	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	14	350
110211	2	2	09/09/91	18	12918	SG	LITTORINA LITTOREA	5103100108	N	2	50
110211	2	2	09/09/91	18	12918	SG	LUNATIA HEROS	5103760410	N	1	25
110211	2	2	09/09/91	18	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110211	2	2	09/09/91	18	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110211	2	2	09/09/91	18	12918	SG	METRIDIUM SP.	3760060199	N	1	25
110211	2	2	09/09/91	18	12918	SG	MYTILIDAE	5507010000	N	476	11900
110211	2	2	09/09/91	18	12918	SG	NAINERIS QUADRICUSPIDA	5001400202	N	2	50
110211	2	2	09/09/91	18	12918	SG	NEREIDAE	500124	N	1	25
110211	2	2	09/09/91	18	12918	SG	OLIGOCHAETA	5004000000	N	129	3225
110211	2	2	09/09/91	18	12918	SG	OPHIUROIDEA	8120	N	11	275
110211	2	2	09/09/91	18	12918	SG	PHOLOE MINUTA	5001060101	N	33	825
110211	2	2	09/09/91	18	12918	SG	PHOXICHILIDIUM FEMORATUM	6001060102	N	1	25
110211	2	2	09/09/91	18	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	12	300
110211	2	2	09/09/91	18	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110211	2	2	09/09/91	18	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	1	25
110211	2	2	09/09/91	18	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110211	2	2	09/09/91	18	12918	SG	SCOLETOMA HEBES	5001319898	N	3	75
110211	2	2	09/09/91	18	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110211	2	2	09/09/91	18	12918	SG	SEMIBALANUS BALANOIDES	6134029898	N	4	100
110211	2	2	09/09/91	18	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	18	450
110211	2	2	09/09/91	18	12918	SG	SYLLIS CORNUTA	5001230306	N	1	25
110211	2	2	09/09/91	18	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110211	2	2	09/09/91	18	12918	SG	TEREBELLIDAE	500168	N	3	75
110211	2	2	09/09/91	18	12918	SG	TONICELLA RUBRA	5303020604	N	6	150
110211	2	2	09/09/91	18	12918	SG	TURBELLARIA	3901000000	N	3	75
110211	2	2	09/09/91	18	12918	SG	UNCIOLA IRRORATA	6169150703	N	3	75
110211	2	2	09/09/91	18	12918	SG	UNCIOLA SP.	6169150799	N	2	50
110211	3	3	09/09/91	18	12918	SG	ALVANIA CASTANEA	5103200108	N	1	25
110211	3	3	09/09/91	18	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110211	3	3	09/09/91	18	12918	SG	NAITIDES MACULATA	5001130106	N	3	75
110211	3	3	09/09/91	18	12918	SG	ANOMIA SP.	5509090299	N	194	4850
110211	3	3	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	40	1000
110211	3	3	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110211	3	3	09/09/91	18	12918	SG	ASABELLIDES OCULATA	5001670802	N	1	25
110211	3	3	09/09/91	18	12918	SG	CALYCELLA SYRINGA	3704019898	C		
110211	3	3	09/09/91	18	12918	SG	CAPITELLA CAPITATA	5001600101	N	932	23300
110211	3	3	09/09/91	18	12918	SG	CARCINUSMAENAS	6189010701	N	1	25
110211	3	3	09/09/91	18	12918	SG	CIRRATULIDAE	5001500000	N	129	3225
110211	3	3	09/09/91	18	12918	SG	CIRRATULUS GRANDIS	5001500104	N	1	25
110211	3	3	09/09/91	18	12918	SG	CISTENIDES GRANULATA	5001660202	N	3	75
110211	3	3	09/09/91	18	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110211	3	3	09/09/91	18	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110211	3	3	09/09/91	18	12918	SG	COROPHIUM SP.	6169150299	N	4	100
110211	3	3	09/09/91	18	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110211	3	3	09/09/91	18	12918	SG	CUMACEA	6154	N	2	50
110211	3	3	09/09/91	18	12918	SG	DEXAMINE THEA	6169170401	N	6	150
110211	3	3	09/09/91	18	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110211	3	3	09/09/91	18	12918	SG	ETEONE LONGA	5001130205	N	1	25
110211	3	3	09/09/91	18	12918	SG	ETEONE SP.	5001130299	N	4	100
110211	3	3	09/09/91	18	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110211	3	3	09/09/91	18	12918	SG	GASTROPODA	51	N	7	175
110211	3	3	09/09/91	18	12918	SG	HALECIUM DIMINUTIVUM	3704060198	C		
110211	3	3	09/09/91	18	12918	SG	HIATELLA SP.	5517060299	N	1	25
110211	3	3	09/09/91	18	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110211	3	3	09/09/91	18	12918	SG	LITTORINA LITTOREA	5103100108	N	3	75
110211	3	3	09/09/91	18	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110211	3	3	09/09/91	18	12918	SG	MACOMA SP.	5515310199	N	1	25
110211	3	3	09/09/91	18	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110211	3	3	09/09/91	18	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	4	100
110211	3	3	09/09/91	18	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110211	3	3	09/09/91	18	12918	SG	MYA ARENARIA	5517010201	N	1	25
110211	3	3	09/09/91	18	12918	SG	MYTILIDAE	5507010000	N	77	1925
110211	3	3	09/09/91	18	12918	SG	NAINERIS QUADRICUSPIDA	5001400202	N	18	450
110211	3	3	09/09/91	18	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110211	3	3	09/09/91	18	12918	SG	OLIGOCHAETA	5004000000	N	559	13975
110211	3	3	09/09/91	18	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	4	100
110211	3	3	09/09/91	18	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110211	3	3	09/09/91	18	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	17	425
110211	3	3	09/09/91	18	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110211	3	3	09/09/91	18	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110211	3	3	09/09/91	18	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110211	3	3	09/09/91	18	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110211	3	3	09/09/91	18	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110211	3	3	09/09/91	18	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110211	3	3	09/09/91	18	12918	SG	SPIOSETOSA	5001430704	N	2	50
110211	3	3	09/09/91	18	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	11	275
110211	3	3	09/09/91	18	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110211	3	3	09/09/91	18	12918	SG	TELLINA AGILIS	5515310205	N	16	400
110211	3	3	09/09/91	18	12918	SG	TURBELLARIA	3901000000	N	1	25
110211	4	4	09/09/91	18	12918	SG	AMPELISCA SP.	6169020199	N	3	75
110211	4	4	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	35	875
110211	4	4	09/09/91	18	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110211	4	4	09/09/91	18	12918	SG	CAPITELLA CAPITATA	5001600101	N	13	325
110211	4	4	09/09/91	18	12918	SG	CIRRATULIDAE	5001500000	N	64	1600
110211	4	4	09/09/91	18	12918	SG	CIRRATULUS GRANDIS	5001500104	N	18	450
110211	4	4	09/09/91	18	12918	SG	CISTENIDES GRANULATA	5001660202	N	2	50
110211	4	4	09/09/91	18	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	3	75
110211	4	4	09/09/91	18	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110211	4	4	09/09/91	18	12918	SG	ETEONE LONGA	5001130205	N	2	50
110211	4	4	09/09/91	18	12918	SG	ETEONE SP.	5001130299	N	1	25
110211	4	4	09/09/91	18	12918	SG	GAMMARUS SP.	6169210799	N	1	25
110211	4	4	09/09/91	18	12918	SG	GASTROPODA	51	N	2	50
110211	4	4	09/09/91	18	12918	SG	HIATELLA SP.	5517060299	N	1	25
110211	4	4	09/09/91	18	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110211	4	4	09/09/91	18	12918	SG	LEPTOGNATHA CAECA	6157020201	N	1	25
110211	4	4	09/09/91	18	12918	SG	LYONSIA HYALINA	5520050206	N	3	75
110211	4	4	09/09/91	18	12918	SG	LYONSIA SP.	5520050299	N	1	25
110211	4	4	09/09/91	18	12918	SG	MACOMA SP.	5515310199	N	1	25
110211	4	4	09/09/91	18	12918	SG	MALDANIDAE	500163	N	1	25
110211	4	4	09/09/91	18	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110211	4	4	09/09/91	18	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110211	4	4	09/09/91	18	12918	SG	MINUSPIO SP.	5001432699	N	5	125
110211	4	4	09/09/91	18	12918	SG	MYTILIDAE	5507010000	N	14	350
110211	4	4	09/09/91	18	12918	SG	NAINERI SQUADRICUSPIDA	5001400202	N	1	25
110211	4	4	09/09/91	18	12918	SG	NUCULA DELPHINODONTA	5502020206	N	1	25
110211	4	4	09/09/91	18	12918	SG	OLIGOCHAETA	5004000000	N	1120	28000
110211	4	4	09/09/91	18	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110211	4	4	09/09/91	18	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	2	50
110211	4	4	09/09/91	18	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	5	125
110211	4	4	09/09/91	18	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110211	4	4	09/09/91	18	12918	SG	SPIO SETOSA	5001430704	N	1	25
110211	4	4	09/09/91	18	12918	SG	SPIONIDAE	500143	N	2	50
110211	4	4	09/09/91	18	12918	SG	TELLINA AGILIS	5515310205	N	11	275
110211	4	4	09/09/91	18	12918	SG	TEREBELLIDAE	500168	N	1	25
110212	4	4	09/09/91	16	12918	SG	ACMAEA TESTUDINALIS	5102050108	N	1	25
110212	4	4	09/09/91	16	12918	SG	AMPELISCA SP.	6169020199	N	5	125
110212	4	4	09/09/91	16	12918	SG	ANAITIDES SP.	5001130199	N	3	75
110212	4	4	09/09/91	16	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	144	3600
110212	4	4	09/09/91	16	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	20	500
110212	4	4	09/09/91	16	12918	SG	BIVALVIA	55	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110212	4	4	09/09/91	16	12918	SG	BOWERBANKIA GRACILIS	7805010201	C		
110212	4	4	09/09/91	16	12918	SG	CALLOPORA COMPLEX	7815080198	C		
110212	4	4	09/09/91	16	12918	SG	CAPITELLA CAPITATA	5001600101	N	4	100
110212	4	4	09/09/91	16	12918	SG	CAPRELLIDAE	617101	N	1	25
110212	4	4	09/09/91	16	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	1	25
110212	4	4	09/09/91	16	12918	SG	CIRRATULIDAE	5001500000	N	61	1525
110212	4	4	09/09/91	16	12918	SG	CISTENIDES GRANULATA	5001660202	N	3	75
110212	4	4	09/09/91	16	12918	SG	CLYMENELLA TORQUATA	5001630202	N	131	3275
110212	4	4	09/09/91	16	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	4	100
110212	4	4	09/09/91	16	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	39	975
110212	4	4	09/09/91	16	12918	SG	COROPHIUM SP.	6169150299	N	29	725
110212	4	4	09/09/91	16	12918	SG	CREPIDULA SP.	5103640299	N	1	25
110212	4	4	09/09/91	16	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110212	4	4	09/09/91	16	12918	SG	DEXAMINE THEA	6169170401	N	6	150
110212	4	4	09/09/91	16	12918	SG	EDOTEA TRILOBA	6162020798	N	7	175
110212	4	4	09/09/91	16	12918	SG	ELECTRA PILOSA	7815050103	C		
110212	4	4	09/09/91	16	12918	SG	ETEONE SP.	5001130299	N	3	75
110212	4	4	09/09/91	16	12918	SG	EUCLYMENE ZONALIS	5001631103	N	2	50
110212	4	4	09/09/91	16	12918	SG	EULALIA VIRIDIS	5001130301	N	1	25
110212	4	4	09/09/91	16	12918	SG	EXOGONE HEBES	5001230707	N	9	225
110212	4	4	09/09/91	16	12918	SG	GASTROPODA	51	N	9	225
110212	4	4	09/09/91	16	12918	SG	HALICHONDRIA PANICEA	3665020202	C		
110212	4	4	09/09/91	16	12918	SG	HALICLONA OCULATA	3663020298	C		
110212	4	4	09/09/91	16	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	2	50
110212	4	4	09/09/91	16	12918	SG	HIATELLA SP.	5517060299	N	9	225
110212	4	4	09/09/91	16	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110212	4	4	09/09/91	16	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	8	200
110212	4	4	09/09/91	16	12918	SG	LACUNA VINCTA	5103090305	N	2	50
110212	4	4	09/09/91	16	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	3	75
110212	4	4	09/09/91	16	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110212	4	4	09/09/91	16	12918	SG	LYONSIA SP.	5520050299	N	15	375
110212	4	4	09/09/91	16	12918	SG	MALDANIDAE	500163	N	68	1700
110212	4	4	09/09/91	16	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110212	4	4	09/09/91	16	12918	SG	MEMBRANIPORA MEMBRANACEA	7815040101	C		
110212	4	4	09/09/91	16	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110212	4	4	09/09/91	16	12918	SG	MICRODEUTOPUS SP.	6169060499	N	9	225
110212	4	4	09/09/91	16	12918	SG	MYA ARENARIA	5517010201	N	1	25
110212	4	4	09/09/91	16	12918	SG	MYTILIDAE	5507010000	N	982	24550
110212	4	4	09/09/91	16	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110212	4	4	09/09/91	16	12918	SG	NEREIDAE	500124	N	1	25
110212	4	4	09/09/91	16	12918	SG	NUCULA DELPHINODONTA	5502020206	N	4	100
110212	4	4	09/09/91	16	12918	SG	NUCULA SP.	5502020299	N	1	25
110212	4	4	09/09/91	16	12918	SG	OLIGOCHAETA	5004000000	N	646	16150
110212	4	4	09/09/91	16	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	4	100
110212	4	4	09/09/91	16	12918	SG	PARACAPRELLA TENUIS	6171010901	N	6	150
110212	4	4	09/09/91	16	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110212	4	4	09/09/91	16	12918	SG	PHOLOE MINUTA	5001060101	N	14	350
110212	4	4	09/09/91	16	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	4	100
110212	4	4	09/09/91	16	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	12	300
110212	4	4	09/09/91	16	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110212	4	4	09/09/91	16	12918	SG	PYGOSPIO ELEGANS	5001431302	N	48	1200
110212	4	4	09/09/91	16	12918	SG	RHYNCHOCOELA	4300000000	N	39	975
110212	4	4	09/09/91	16	12918	SG	SCOLETOMA HEBES	5001319898	N	14	350
110212	4	4	09/09/91	16	12918	SG	SCOLETOMA SP.	5001319899	N	18	450
110212	4	4	09/09/91	16	12918	SG	SPIO SETOSA	5001430704	N	11	275
110212	4	4	09/09/91	16	12918	SG	SPIONIDAE	500143	N	3	75
110212	4	4	09/09/91	16	12918	SG	SPIOPHANES BOMBYX	5001431001	N	12	300
110212	4	4	09/09/91	16	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110212	4	4	09/09/91	16	12918	SG	TELLINA AGILIS	5515310205	N	17	425
110212	4	4	09/09/91	16	12918	SG	TEREBELLIDAE	500168	N	1	25
110212	4	4	09/09/91	16	12918	SG	TURBELLARIA	3901000000	N	1	25
110212	1	1	09/10/91	16	12918	SG	ACHELIA SPINOSA	6001040202	N	1	25
110212	1	1	09/10/91	16	12918	SG	AMPELISCA ABDITA	6169020108	N	2	50
110212	1	1	09/10/91	16	12918	SG	NAITIDES MACULATA	5001130106	N	2	50
110212	1	1	09/10/91	16	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110212	1	1	09/10/91	16	12918	SG	ANOMIA SP.	5509090299	N	2	50
110212	1	1	09/10/91	16	12918	SG	APLIDIUM SP.	8403020199	C		
110212	1	1	09/10/91	16	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	307	7675
110212	1	1	09/10/91	16	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	61	1525
110212	1	1	09/10/91	16	12918	SG	CALLOPORA AURITA	7815080101	C		
110212	1	1	09/10/91	16	12918	SG	CALLOPORA COMPLEX	7815080198	C		
110212	1	1	09/10/91	16	12918	SG	CANCER IRRORATUS	6188030108	N	1	25
110212	1	1	09/10/91	16	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110212	1	1	09/10/91	16	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	2	50
110212	1	1	09/10/91	16	12918	SG	CIRRATULIDAE	5001500000	N	92	2300
110212	1	1	09/10/91	16	12918	SG	CLYMENELLA TORQUATA	5001630202	N	133	3325
110212	1	1	09/10/91	16	12918	SG	COROPHIUM SP.	6169150299	N	12	300
110212	1	1	09/10/91	16	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110212	1	1	09/10/91	16	12918	SG	DYNAMENA PUMILA	3704050697	C		
110212	1	1	09/10/91	16	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110212	1	1	09/10/91	16	12918	SG	ELECTRA PILOSA	7815050103	C		
110212	1	1	09/10/91	16	12918	SG	ETEONE SP.	5001130299	N	4	100
110212	1	1	09/10/91	16	12918	SG	EXOGONE HEBES	5001230707	N	14	350
110212	1	1	09/10/91	16	12918	SG	GASTROPODA	51	N	4	100
110212	1	1	09/10/91	16	12918	SG	HALECIUM DIMINUTIVUM	3704060198	C		
110212	1	1	09/10/91	16	12918	SG	HALICHONDRIA PANICEA	3665020202	C		
110212	1	1	09/10/91	16	12918	SG	HALICLONA OCULATA	3663020298	C		

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110212	1	1	09/10/91	16	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110212	1	1	09/10/91	16	12918	SG	HIATELLA SP.	5517060299	N	3	75
110212	1	1	09/10/91	16	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110212	1	1	09/10/91	16	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	2	50
110212	1	1	09/10/91	16	12918	SG	LACUNA VINCTA	5103090305	N	2	50
110212	1	1	09/10/91	16	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110212	1	1	09/10/91	16	12918	SG	LEPTOGNATHA CAECA	6157020201	N	1	25
110212	1	1	09/10/91	16	12918	SG	LYONSIA SP.	5520050299	N	10	250
110212	1	1	09/10/91	16	12918	SG	MACOMA SP.	5515310199	N	1	25
110212	1	1	09/10/91	16	12918	SG	MALDANIDAE	500163	N	46	1150
110212	1	1	09/10/91	16	12918	SG	MEDIOMASTUS SP.	5001600499	N	4	100
110212	1	1	09/10/91	16	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110212	1	1	09/10/91	16	12918	SG	MICRODEUTOPUS SP.	6169060499	N	2	50
110212	1	1	09/10/91	16	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	4	100
110212	1	1	09/10/91	16	12918	SG	MYA ARENARIA	5517010201	N	1	25
110212	1	1	09/10/91	16	12918	SG	MYTILIDAE	5507010000	N	290	7250
110212	1	1	09/10/91	16	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110212	1	1	09/10/91	16	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110212	1	1	09/10/91	16	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110212	1	1	09/10/91	16	12918	SG	NUCULA DELPHINODONTA	5502020206	N	1	25
110212	1	1	09/10/91	16	12918	SG	ODOSTOMIA SP.	5108010199	N	2	50
110212	1	1	09/10/91	16	12918	SG	OLIGOCHAETA	5004000000	N	877	21925
110212	1	1	09/10/91	16	12918	SG	PEDICELLINA CERNUA	7902010101	C		
110212	1	1	09/10/91	16	12918	SG	PHOLOE MINUTA	5001060101	N	15	375
110212	1	1	09/10/91	16	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	11	275
110212	1	1	09/10/91	16	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110212	1	1	09/10/91	16	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	7	175
110212	1	1	09/10/91	16	12918	SG	PYGOSPIO ELEGANS	5001431302	N	47	1175
110212	1	1	09/10/91	16	12918	SG	RHYNCHOCOELA	4300000000	N	20	500
110212	1	1	09/10/91	16	12918	SG	SCOLETOMA HEBES	5001319898	N	20	500
110212	1	1	09/10/91	16	12918	SG	SCOLETOMA SP.	5001319899	N	25	625
110212	1	1	09/10/91	16	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110212	1	1	09/10/91	16	12918	SG	SOLEMYA SP.	5504010199	N	1	25
110212	1	1	09/10/91	16	12918	SG	SPIOSETOSA	5001430704	N	4	100
110212	1	1	09/10/91	16	12918	SG	SPIOPHANES BOMBYX	5001431001	N	5	125
110212	1	1	09/10/91	16	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	14	350
110212	1	1	09/10/91	16	12918	SG	TELLINA AGILIS	5515310205	N	23	575
110212	1	1	09/10/91	16	12918	SG	TEREBELLIDAE	500168	N	1	25
110212	2	2	09/10/91	16	12918	SG	ANOMIA SP.	5509090299	N	1	25
110212	2	2	09/10/91	16	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	221	5525
110212	2	2	09/10/91	16	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	6	150
110212	2	2	09/10/91	16	12918	SG	CALLOPORA COMPLEX	7815080198	C		
110212	2	2	09/10/91	16	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	4	100
110212	2	2	09/10/91	16	12918	SG	CIRRATULIDAE	5001500000	N	326	8150
110212	2	2	09/10/91	16	12918	SG	CLYMENELLA TORQUATA	5001630202	N	31	775
110212	2	2	09/10/91	16	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110212	2	2	09/10/91	16	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	3	75
110212	2	2	09/10/91	16	12918	SG	COROPHIUM SP.	6169150299	N	2	50
110212	2	2	09/10/91	16	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110212	2	2	09/10/91	16	12918	SG	CUMACEA	6154	N	1	25
110212	2	2	09/10/91	16	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110212	2	2	09/10/91	16	12918	SG	ETEONE LONGA	5001130205	N	4	100
110212	2	2	09/10/91	16	12918	SG	ETEONE SP.	5001130299	N	3	75
110212	2	2	09/10/91	16	12918	SG	EUCLYMENE ZONALIS	5001631103	N	2	50
110212	2	2	09/10/91	16	12918	SG	EXOGONE HEBES	5001230707	N	38	950
110212	2	2	09/10/91	16	12918	SG	GASTROPODA	51	N	8	200
110212	2	2	09/10/91	16	12918	SG	GLYCERA DIBRANCHIATA	5001270105	N	1	25
110212	2	2	09/10/91	16	12918	SG	HETEROTANAIS LIMICOLA	6157029898	N	2	50
110212	2	2	09/10/91	16	12918	SG	HIATELLA SP.	5517060299	N	1	25
110212	2	2	09/10/91	16	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110212	2	2	09/10/91	16	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110212	2	2	09/10/91	16	12918	SG	LACUNA VINCTA	5103090305	N	2	50
110212	2	2	09/10/91	16	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	1	25
110212	2	2	09/10/91	16	12918	SG	LYONSIA HYALINA	5520050206	N	17	425
110212	2	2	09/10/91	16	12918	SG	LYONSIA SP.	5520050299	N	2	50
110212	2	2	09/10/91	16	12918	SG	MALDANIDAE	500163	N	8	200
110212	2	2	09/10/91	16	12918	SG	MEDIOMASTUS SP.	5001600499	N	4	100
110212	2	2	09/10/91	16	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110212	2	2	09/10/91	16	12918	SG	MYA ARENARIA	5517010201	N	1	25
110212	2	2	09/10/91	16	12918	SG	MYTILIDAE	5507010000	N	76	1900
110212	2	2	09/10/91	16	12918	SG	NAINERIS QUADRICUSPIDA	5001400202	N	16	400
110212	2	2	09/10/91	16	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110212	2	2	09/10/91	16	12918	SG	NUCULA DELPHINODONTA	5502020206	N	9	225
110212	2	2	09/10/91	16	12918	SG	NUCULA SP.	5502020299	N	2	50
110212	2	2	09/10/91	16	12918	SG	OLIGOCHAETA	5004000000	N	387	9675
110212	2	2	09/10/91	16	12918	SG	OXYUROSTY LISSMITHI	6154050801	N	1	25
110212	2	2	09/10/91	16	12918	SG	PHOLOE MINUTA	5001060101	N	9	225
110212	2	2	09/10/91	16	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	1	25
110212	2	2	09/10/91	16	12918	SG	PYGOSPIO ELEGANS	5001431302	N	49	1225
110212	2	2	09/10/91	16	12918	SG	RHYNCHOCOELA	4300000000	N	6	150
110212	2	2	09/10/91	16	12918	SG	SCOLETOMA HEBES	5001319898	N	1	25
110212	2	2	09/10/91	16	12918	SG	SCOLETOMA SP.	5001319899	N	35	875
110212	2	2	09/10/91	16	12918	SG	SOLEMYA SP.	5504010199	N	2	50
110212	2	2	09/10/91	16	12918	SG	SPIOSETOSA	5001430704	N	13	325
110212	2	2	09/10/91	16	12918	SG	SPIOPHANES BOMBYX	5001431001	N	21	525
110212	2	2	09/10/91	16	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110212	2	2	09/10/91	16	12918	SG	TELLINA AGILIS	5515310205	N	40	1000

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110212	2	2	09/10/91	16	12918	SG	TEREBELLIDAE	500168	N	1	25
110212	2	2	09/10/91	16	12918	SG	TURBELLARIA	3901000000	N	2	50
110212	3	3	09/10/91	16	12918	SG	ALVANIA SP.	5103200199	N	1	25
110212	3	3	09/10/91	16	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110212	3	3	09/10/91	16	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110212	3	3	09/10/91	16	12918	SG	ANAITIDES SP.	5001130199	N	10	250
110212	3	3	09/10/91	16	12918	SG	ANOMIA SP.	5509090299	N	2	50
110212	3	3	09/10/91	16	12918	SG	APLIDIUM SP.	8403020199	C		
110212	3	3	09/10/91	16	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	280	7000
110212	3	3	09/10/91	16	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	3	75
110212	3	3	09/10/91	16	12918	SG	ASABELLIDES OCULATA	5001670802	N	1	25
110212	3	3	09/10/91	16	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110212	3	3	09/10/91	16	12918	SG	CIRRATULIDAE	5001500000	N	159	3975
110212	3	3	09/10/91	16	12918	SG	CLYMENELLA TORQUATA	5001630202	N	517	12925
110212	3	3	09/10/91	16	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	12	300
110212	3	3	09/10/91	16	12918	SG	COROPHIUM SP.	6169150299	N	8	200
110212	3	3	09/10/91	16	12918	SG	DEXAMINE THEA	6169170401	N	2	50
110212	3	3	09/10/91	16	12918	SG	EDOTEA TRILOBA	6162020798	N	2	50
110212	3	3	09/10/91	16	12918	SG	ETEONE LONGA	5001130205	N	6	150
110212	3	3	09/10/91	16	12918	SG	ETEONE SP.	5001130299	N	7	175
110212	3	3	09/10/91	16	12918	SG	EUDENDRIUM RUGOSUM	3703080197	C		
110212	3	3	09/10/91	16	12918	SG	EXOGONE HEBES	5001230707	N	62	1550
110212	3	3	09/10/91	16	12918	SG	GASTROPODA	51	N	6	150
110212	3	3	09/10/91	16	12918	SG	GLYCERA DIBRANCHIATA	5001270105	N	1	25
110212	3	3	09/10/91	16	12918	SG	HALICHONDRIA PANICEA	3665020202	C		
110212	3	3	09/10/91	16	12918	SG	HIATELLA SP.	5517060299	N	9	225
110212	3	3	09/10/91	16	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110212	3	3	09/10/91	16	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	7	175
110212	3	3	09/10/91	16	12918	SG	LACUNA VINCTA	5103090305	N	3	75
110212	3	3	09/10/91	16	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	2	50
110212	3	3	09/10/91	16	12918	SG	LUNATIA SP.	5103760499	N	1	25
110212	3	3	09/10/91	16	12918	SG	LYONSIAHYALINA	5520050206	N	13	325
110212	3	3	09/10/91	16	12918	SG	MACOMA SP.	5515310199	N	1	25
110212	3	3	09/10/91	16	12918	SG	MALDANIDAE	500163	N	42	1050
110212	3	3	09/10/91	16	12918	SG	MEDIOMASTUS SP.	5001600499	N	4	100
110212	3	3	09/10/91	16	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	3	75
110212	3	3	09/10/91	16	12918	SG	MICRODEUTOPUS SP.	6169060499	N	2	50
110212	3	3	09/10/91	16	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110212	3	3	09/10/91	16	12918	SG	MYA ARENARIA	5517010201	N	7	175
110212	3	3	09/10/91	16	12918	SG	MYTILIDAE	5507010000	N	514	12850
110212	3	3	09/10/91	16	12918	SG	NAINERIS QUADRICUSPIDA	5001400202	N	1	25
110212	3	3	09/10/91	16	12918	SG	NEPHTYIDAE	5001250000	N	2	50
110212	3	3	09/10/91	16	12918	SG	NEPHTYS CAECA	5001250103	N	2	50
110212	3	3	09/10/91	16	12918	SG	NEPHTYS CILIATA	5001250102	N	4	100
110212	3	3	09/10/91	16	12918	SG	NEREIDAE	500124	N	1	25
110212	3	3	09/10/91	16	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110212	3	3	09/10/91	16	12918	SG	NUCULA DELPHINODONTA	5502020206	N	2	50
110212	3	3	09/10/91	16	12918	SG	NUCULA SP.	5502020299	N	1	25
110212	3	3	09/10/91	16	12918	SG	ODOSTOMIA SP.	5108010199	N	1	25
110212	3	3	09/10/91	16	12918	SG	OLIGOCHAETA	5004000000	N	773	19325
110212	3	3	09/10/91	16	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	3	75
110212	3	3	09/10/91	16	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110212	3	3	09/10/91	16	12918	SG	PHOLOE MINUTA	5001060101	N	15	375
110212	3	3	09/10/91	16	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110212	3	3	09/10/91	16	12918	SG	POLYDORA CORNUTA	5001430498	N	5	125
110212	3	3	09/10/91	16	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	23	575
110212	3	3	09/10/91	16	12918	SG	PYGOSPIO ELEGANS	5001431302	N	131	3275
110212	3	3	09/10/91	16	12918	SG	RHYNCHOCOELA	4300000000	N	11	275
110212	3	3	09/10/91	16	12918	SG	SCOLETOMA HEBES	5001319898	N	10	250
110212	3	3	09/10/91	16	12918	SG	SCOLETOMA SP.	5001319899	N	26	650
110212	3	3	09/10/91	16	12918	SG	SOLEMYA VELUM	5504010101	N	2	50
110212	3	3	09/10/91	16	12918	SG	SPIO SETOSA	5001430704	N	10	250
110212	3	3	09/10/91	16	12918	SG	SPIONIDAE	500143	N	3	75
110212	3	3	09/10/91	16	12918	SG	SPIOPHANES BOMBYX	5001431001	N	20	500
110212	3	3	09/10/91	16	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	3	75
110212	3	3	09/10/91	16	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3	75
110212	3	3	09/10/91	16	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110212	3	3	09/10/91	16	12918	SG	TELLINA AGILIS	5515310205	N	81	2025
110212	3	3	09/10/91	16	12918	SG	TEREBELLIDAE	500168	N	1	25
110212	3	3	09/10/91	16	12918	SG	TURBELLARIA	3901000000	N	1	25
110214	1	1	09/10/91	14	12918	SG	ACHELIA SPINOSA	6001040202	N	1	25
110214	1	1	09/10/91	14	12918	SG	NAITIDES MACULATA	5001130106	N	4	100
110214	1	1	09/10/91	14	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110214	1	1	09/10/91	14	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	2	50
110214	1	1	09/10/91	14	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110214	1	1	09/10/91	14	12918	SG	CIRRATULIDAE	5001500000	N	4	100
110214	1	1	09/10/91	14	12918	SG	CIRRATULUS GRANDIS	5001500104	N	7	175
110214	1	1	09/10/91	14	12918	SG	CISTENIDES GRANULATA	5001660202	N	3	75
110214	1	1	09/10/91	14	12918	SG	CLYMENELLA TORQUATA	5001630202	N	14	350
110214	1	1	09/10/91	14	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110214	1	1	09/10/91	14	12918	SG	DEXAMINE THEA	6169170401	N	4	100
110214	1	1	09/10/91	14	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110214	1	1	09/10/91	14	12918	SG	ETEONE LONGA	5001130205	N	3	75
110214	1	1	09/10/91	14	12918	SG	ETEONE SP.	5001130299	N	4	100
110214	1	1	09/10/91	14	12918	SG	EXOGONE HEBES	5001230707	N	10	250
110214	1	1	09/10/91	14	12918	SG	GASTROPODA	51	N	16	400
110214	1	1	09/10/91	14	12918	SG	LITTORINA LITTOREA	5103100108	N	5	125

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
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110214	1	1	09/10/91	14	12918	SG	LYONSIA SP.	5520050299	N	1	25
110214	1	1	09/10/91	14	12918	SG	MACOMA SP.	5515310199	N	14	350
110214	1	1	09/10/91	14	12918	SG	MALDANIDAE	500163	N	74	1850
110214	1	1	09/10/91	14	12918	SG	MYTILIDAE	5507010000	N	289	7225
110214	1	1	09/10/91	14	12918	SG	NAINERIS QUADRICUSPIDA	5001400202	N	7	175
110214	1	1	09/10/91	14	12918	SG	NEANTHES VIRENS	5001240302	N	10	250
110214	1	1	09/10/91	14	12918	SG	NEREIDAE	500124	N	2	50
110214	1	1	09/10/91	14	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110214	1	1	09/10/91	14	12918	SG	OLIGOCHAETA	5004000000	N	153	3825
110214	1	1	09/10/91	14	12918	SG	OXYUROSTY LISSMITHI	6154050801	N	1	25
110214	1	1	09/10/91	14	12918	SG	PHOLOE MINUTA	5001060101	N	10	250
110214	1	1	09/10/91	14	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	4	100
110214	1	1	09/10/91	14	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110214	1	1	09/10/91	14	12918	SG	PYGOSPIO ELEGANS	5001431302	N	57	1425
110214	1	1	09/10/91	14	12918	SG	RHYNCHOCOELA	4300000000	N	5	125
110214	1	1	09/10/91	14	12918	SG	SOLEMYA SP.	5504010199	N	2	50
110214	1	1	09/10/91	14	12918	SG	SPIO SETOSA	5001430704	N	73	1825
110214	1	1	09/10/91	14	12918	SG	SPIONIDAE	500143	N	1	25
110214	1	1	09/10/91	14	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	26	650
110214	1	1	09/10/91	14	12918	SG	TELLINA AGILIS	5515310205	N	12	300
110214	2	2	09/10/91	14	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	1	25
110214	2	2	09/10/91	14	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110214	2	2	09/10/91	14	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110214	2	2	09/10/91	14	12918	SG	NAITIDES MUCOSA	5001130104	N	3	75
110214	2	2	09/10/91	14	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	6	150
110214	2	2	09/10/91	14	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110214	2	2	09/10/91	14	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110214	2	2	09/10/91	14	12918	SG	CIRRATULIDAE	5001500000	N	49	1225
110214	2	2	09/10/91	14	12918	SG	CLYMENELLA TORQUATA	5001630202	N	324	8100
110214	2	2	09/10/91	14	12918	SG	ETEONE LONGA	5001130205	N	2	50
110214	2	2	09/10/91	14	12918	SG	ETEONE SP.	5001130299	N	4	100
110214	2	2	09/10/91	14	12918	SG	EXOGONE HEBES	5001230707	N	4	100
110214	2	2	09/10/91	14	12918	SG	LITTORINA LITTOREA	5103100108	N	1	25
110214	2	2	09/10/91	14	12918	SG	MALDANIDAE	500163	N	17	425
110214	2	2	09/10/91	14	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110214	2	2	09/10/91	14	12918	SG	MYTILIDAE	5507010000	N	12	300
110214	2	2	09/10/91	14	12918	SG	NEPHTYIDAE	5001250000	N	2	50
110214	2	2	09/10/91	14	12918	SG	NEPHTYS CAECA	5001250103	N	1	25
110214	2	2	09/10/91	14	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110214	2	2	09/10/91	14	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110214	2	2	09/10/91	14	12918	SG	OLIGOCHAETA	5004000000	N	121	3025
110214	2	2	09/10/91	14	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110214	2	2	09/10/91	14	12918	SG	POLYDORA CORNUTA	5001430498	N	15	375
110214	2	2	09/10/91	14	12918	SG	POLYDORAQUADRILOBATA	5001430408	N	8	200
110214	2	2	09/10/91	14	12918	SG	PYGOSPIO ELEGANS	5001431302	N	154	3850
110214	2	2	09/10/91	14	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110214	2	2	09/10/91	14	12918	SG	SCOLELEPIS TEXANA	5001432006	N	1	25
110214	2	2	09/10/91	14	12918	SG	SCOLETOMA HEBES	5001319898	N	1	25
110214	2	2	09/10/91	14	12918	SG	SPIOSETOSA	5001430704	N	17	425
110214	2	2	09/10/91	14	12918	SG	SPIOPHANES BOMBYX	5001431001	N	4	100
110214	2	2	09/10/91	14	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	10	250
110214	2	2	09/10/91	14	12918	SG	TELLINA AGILIS	5515310205	N	9	225
110214	3	3	09/10/91	14	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	1	25
110214	3	3	09/10/91	14	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110214	3	3	09/10/91	14	12918	SG	AMPELISCA SP.	6169020199	N	13	325
110214	3	3	09/10/91	14	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	4	100
110214	3	3	09/10/91	14	12918	SG	CIRRATULIDAE	5001500000	N	17	425
110214	3	3	09/10/91	14	12918	SG	CLYMENELLA TORQUATA	5001630202	N	4	100
110214	3	3	09/10/91	14	12918	SG	GAMMARUS SP.	6169210799	N	2	50
110214	3	3	09/10/91	14	12918	SG	LITTORINA LITTOREA	5103100108	N	2	50
110214	3	3	09/10/91	14	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110214	3	3	09/10/91	14	12918	SG	MACOMA SP.	5515310199	N	2	50
110214	3	3	09/10/91	14	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110214	3	3	09/10/91	14	12918	SG	MINUSPIO SP.	5001432699	N	3	75
110214	3	3	09/10/91	14	12918	SG	MYTILIDAE	5507010000	N	1	25
110214	3	3	09/10/91	14	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110214	3	3	09/10/91	14	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110214	3	3	09/10/91	14	12918	SG	OLIGOCHAETA	5004000000	N	38	950
110214	3	3	09/10/91	14	12918	SG	OXYUROSTY LISSMITHI	6154050801	N	3	75
110214	3	3	09/10/91	14	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110214	3	3	09/10/91	14	12918	SG	POLYDORA CORNUTA	5001430498	N	4	100
110214	3	3	09/10/91	14	12918	SG	POLYDORA SOCIALIS	5001430402	N	1	25
110214	3	3	09/10/91	14	12918	SG	PYGOSPIO ELEGANS	5001431302	N	84	2100
110214	3	3	09/10/91	14	12918	SG	SOLEMYA SP.	5504010199	N	2	50
110214	3	3	09/10/91	14	12918	SG	SPIOSETOSA	5001430704	N	3	75
110214	3	3	09/10/91	14	12918	SG	SPIOPHANES BOMBYX	5001431001	N	1	25
110214	3	3	09/10/91	14	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2	50
110214	3	3	09/10/91	14	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110214	4	4	09/10/91	14	12918	SG	AGLAOPHAMUS CIRCINATA	5001250304	N	1	25
110214	4	4	09/10/91	14	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	1	25
110214	4	4	09/10/91	14	12918	SG	AMPELISCA ABDITA	6169020108	N	14	350
110214	4	4	09/10/91	14	12918	SG	AMPELISCA SP.	6169020199	N	18	450
110214	4	4	09/10/91	14	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110214	4	4	09/10/91	14	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110214	4	4	09/10/91	14	12918	SG	BIVALVIA	55	N	1	25
110214	4	4	09/10/91	14	12918	SG	CHIRIDOTEA TUFTSI	6162020503	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110214	4	4	09/10/91	14	12918	SG	CIRRATULIDAE	5001500000	N	60	1500
110214	4	4	09/10/91	14	12918	SG	CLYMENELLA TORQUATA	5001630202	N	20	500
110214	4	4	09/10/91	14	12918	SG	ETEONE LONGA	5001130205	N	1	25
110214	4	4	09/10/91	14	12918	SG	ETEONE SP.	5001130299	N	1	25
110214	4	4	09/10/91	14	12918	SG	GAMMARUS OCEANICUS	6169210711	N	38	950
110214	4	4	09/10/91	14	12918	SG	GAMMARUS SP.	6169210799	N	14	350
110214	4	4	09/10/91	14	12918	SG	HIATELLA SP.	5517060299	N	2	50
110214	4	4	09/10/91	14	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110214	4	4	09/10/91	14	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110214	4	4	09/10/91	14	12918	SG	MALDANIDAE	500163	N	1	25
110214	4	4	09/10/91	14	12918	SG	MEDIOMASTUS SP.	5001600499	N	6	150
110214	4	4	09/10/91	14	12918	SG	MYTILIDAE	5507010000	N	1	25
110214	4	4	09/10/91	14	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110214	4	4	09/10/91	14	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110214	4	4	09/10/91	14	12918	SG	OLIGOCHAETA	5004000000	N	119	2975
110214	4	4	09/10/91	14	12918	SG	PHOLOE MINUTA	5001060101	N	3	75
110214	4	4	09/10/91	14	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110214	4	4	09/10/91	14	12918	SG	PYGOSPIO ELEGANS	5001431302	N	68	1700
110214	4	4	09/10/91	14	12918	SG	SPIO SETOSA	5001430704	N	7	175
110214	4	4	09/10/91	14	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	8	200
110214	4	4	09/10/91	14	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110215	1	1	09/10/91	15	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	4	100
110215	1	1	09/10/91	15	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110215	1	1	09/10/91	15	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110215	1	1	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	47	1175
110215	1	1	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110215	1	1	09/10/91	15	12918	SG	BIVALVIA	55	N	2	50
110215	1	1	09/10/91	15	12918	SG	CAPITELLA CAPITATA	5001600101	N	299	7475
110215	1	1	09/10/91	15	12918	SG	CIRRATULIDAE	5001500000	N	41	1025
110215	1	1	09/10/91	15	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	9	225
110215	1	1	09/10/91	15	12918	SG	FABRICIA SABELLA	5001701301	N	6	150
110215	1	1	09/10/91	15	12918	SG	GASTROPODA	51	N	1	25
110215	1	1	09/10/91	15	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	4	100
110215	1	1	09/10/91	15	12918	SG	LYONSIA SP.	5520050299	N	5	125
110215	1	1	09/10/91	15	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	2	50
110215	1	1	09/10/91	15	12918	SG	MYTILIDAE	5507010000	N	119	2975
110215	1	1	09/10/91	15	12918	SG	NEANTHES VIRENS	5001240302	N	4	100
110215	1	1	09/10/91	15	12918	SG	NEPHTYS INCISA	5001250115	N	4	100
110215	1	1	09/10/91	15	12918	SG	NEREIDAE	500124	N	2	50
110215	1	1	09/10/91	15	12918	SG	OLIGOCHAETA	5004000000	N	1872	46800
110215	1	1	09/10/91	15	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110215	1	1	09/10/91	15	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110215	1	1	09/10/91	15	12918	SG	POLYDORA CORNUTA	5001430498	N	3	75
110215	1	1	09/10/91	15	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110215	1	1	09/10/91	15	12918	SG	SOLEMYA SP.	5504010199	N	2	50
110215	1	1	09/10/91	15	12918	SG	SPIOPHANES BOMBYX	5001431001	N	1	25
110215	1	1	09/10/91	15	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	457	11425
110215	1	1	09/10/91	15	12918	SG	TELLINA AGILIS	5515310205	N	12	300
110215	1	1	09/10/91	15	12918	SG	TEREBELLIDAE	500168	N	1	25
110215	2	2	09/10/91	15	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	9	225
110215	2	2	09/10/91	15	12918	SG	AMPELISCA ABDITA	6169020108	N	9	225
110215	2	2	09/10/91	15	12918	SG	AMPELISCA SP.	6169020199	N	13	325
110215	2	2	09/10/91	15	12918	SG	AMPHARETE SP.	5001670299	N	1	25
110215	2	2	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	32	800
110215	2	2	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	21	525
110215	2	2	09/10/91	15	12918	SG	BARENTSIA SP.	7902010299	C		
110215	2	2	09/10/91	15	12918	SG	BIVALVIA	55	N	2	50
110215	2	2	09/10/91	15	12918	SG	CAPITELLA CAPITATA	5001600101	N	263	6575
110215	2	2	09/10/91	15	12918	SG	CIRRATULIDAE	5001500000	N	89	2225
110215	2	2	09/10/91	15	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	8	200
110215	2	2	09/10/91	15	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110215	2	2	09/10/91	15	12918	SG	CREPIDULA SP.	5103640299	N	2	50
110215	2	2	09/10/91	15	12918	SG	DENDROBEANIA MURRAYANA	7815250201	C		
110215	2	2	09/10/91	15	12918	SG	ETEONE SP.	5001130299	N	2	50
110215	2	2	09/10/91	15	12918	SG	EUDENDRIUM SP.	3703080199	C		
110215	2	2	09/10/91	15	12918	SG	FABRICIA SABELLA	5001701301	N	12	300
110215	2	2	09/10/91	15	12918	SG	HIATELLA SP.	5517060299	N	4	100
110215	2	2	09/10/91	15	12918	SG	ISODICTYA DEICHMANNE	3663989898	C		
110215	2	2	09/10/91	15	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110215	2	2	09/10/91	15	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	8	200
110215	2	2	09/10/91	15	12918	SG	LEUCON AMERICANUS	6154040110	N	3	75
110215	2	2	09/10/91	15	12918	SG	LYONSIA HYALINA	5520050206	N	10	250
110215	2	2	09/10/91	15	12918	SG	LYONSIA SP.	5520050299	N	2	50
110215	2	2	09/10/91	15	12918	SG	MACOMA SP.	5515310199	N	17	425
110215	2	2	09/10/91	15	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110215	2	2	09/10/91	15	12918	SG	MYTILIDAE	5507010000	N	138	3450
110215	2	2	09/10/91	15	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110215	2	2	09/10/91	15	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110215	2	2	09/10/91	15	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110215	2	2	09/10/91	15	12918	SG	OBELIA DICHOTOMA	3704010205	C		
110215	2	2	09/10/91	15	12918	SG	OLIGOCHAETA	5004000000	N	2508	62700
110215	2	2	09/10/91	15	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110215	2	2	09/10/91	15	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110215	2	2	09/10/91	15	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110215	2	2	09/10/91	15	12918	SG	POLYDORA CORNUTA	5001430498	N	8	200
110215	2	2	09/10/91	15	12918	SG	PYGOSPIO ELEGANS	5001431302	N	8	200
110215	2	2	09/10/91	15	12918	SG	SCOLETOMA HEBES	5001319898	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110215	2	2	09/10/91	15	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110215	2	2	09/10/91	15	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110215	2	2	09/10/91	15	12918	SG	SOLEMYA SP.	5504010199	N	2	50
110215	2	2	09/10/91	15	12918	SG	SOLENIDAE	551529	N	1	25
110215	2	2	09/10/91	15	12918	SG	SPIONIDAE	500143	N	4	100
110215	2	2	09/10/91	15	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	429	10725
110215	2	2	09/10/91	15	12918	SG	TELLINA AGILIS	5515310205	N	7	175
110215	2	2	09/10/91	15	12918	SG	TEREBELLIDAE	500168	N	1	25
110215	3	3	09/10/91	15	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	6	150
110215	3	3	09/10/91	15	12918	SG	AMPELISCA ABDITA	6169020108	N	2	50
110215	3	3	09/10/91	15	12918	SG	AMPELISCA SP.	6169020199	N	10	250
110215	3	3	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	20	500
110215	3	3	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	8	200
110215	3	3	09/10/91	15	12918	SG	BIVALVIA	55	N	1	25
110215	3	3	09/10/91	15	12918	SG	CAPITELLA CAPITATA	5001600101	N	82	2050
110215	3	3	09/10/91	15	12918	SG	CARCINUS MAENAS	6189010701	N	2	50
110215	3	3	09/10/91	15	12918	SG	CIRRATULIDAE	5001500000	N	42	1050
110215	3	3	09/10/91	15	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110215	3	3	09/10/91	15	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	4	100
110215	3	3	09/10/91	15	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110215	3	3	09/10/91	15	12918	SG	CRANGON SEPTEMSPINOSA	6179220103	N	1	25
110215	3	3	09/10/91	15	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110215	3	3	09/10/91	15	12918	SG	ETEONE SP.	5001130299	N	1	25
110215	3	3	09/10/91	15	12918	SG	FABRICIA SABELLA	5001701301	N	1	25
110215	3	3	09/10/91	15	12918	SG	GASTROPODA	51	N	12	300
110215	3	3	09/10/91	15	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110215	3	3	09/10/91	15	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	5	125
110215	3	3	09/10/91	15	12918	SG	LYONSIA SP.	5520050299	N	2	50
110215	3	3	09/10/91	15	12918	SG	MACOMA SP.	5515310199	N	6	150
110215	3	3	09/10/91	15	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110215	3	3	09/10/91	15	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	14	350
110215	3	3	09/10/91	15	12918	SG	MICRODEUTOPUS SP.	6169060499	N	9	225
110215	3	3	09/10/91	15	12918	SG	MYTILIDAE	5507010000	N	186	4650
110215	3	3	09/10/91	15	12918	SG	NEANTHES VIRENS	5001240302	N	7	175
110215	3	3	09/10/91	15	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110215	3	3	09/10/91	15	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110215	3	3	09/10/91	15	12918	SG	NEREIDAE	500124	N	3	75
110215	3	3	09/10/91	15	12918	SG	OLIGOCHAETA	5004000000	N	1701	42525
110215	3	3	09/10/91	15	12918	SG	PHOLOE MINUTA	5001060101	N	3	75
110215	3	3	09/10/91	15	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110215	3	3	09/10/91	15	12918	SG	POLYDORA CORNUTA	5001430498	N	5	125
110215	3	3	09/10/91	15	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	1	25
110215	3	3	09/10/91	15	12918	SG	PYGOSPIO ELEGANS	5001431302	N	10	250
110215	3	3	09/10/91	15	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110215	3	3	09/10/91	15	12918	SG	SCOLETOMA HEBES	5001319898	N	6	150
110215	3	3	09/10/91	15	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110215	3	3	09/10/91	15	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	805	20125
110215	3	3	09/10/91	15	12918	SG	TELLINA AGILIS	5515310205	N	18	450
110215	4	4	09/10/91	15	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	3	75
110215	4	4	09/10/91	15	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110215	4	4	09/10/91	15	12918	SG	AMPELISCA SP.	6169020199	N	47	1175
110215	4	4	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	26	650
110215	4	4	09/10/91	15	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	4	100
110215	4	4	09/10/91	15	12918	SG	BIVALVIA	55	N	2	50
110215	4	4	09/10/91	15	12918	SG	CAPITELLA CAPITATA	5001600101	N	286	7150
110215	4	4	09/10/91	15	12918	SG	CIRRATULIDAE	5001500000	N	103	2575
110215	4	4	09/10/91	15	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	10	250
110215	4	4	09/10/91	15	12918	SG	COROPHIUM SP.	6169150299	N	14	350
110215	4	4	09/10/91	15	12918	SG	CREPIDULA SP.	5103640299	N	1	25
110215	4	4	09/10/91	15	12918	SG	EDOTEA TRILOBA	6162020798	N	2	50
110215	4	4	09/10/91	15	12918	SG	ETEONE LONGA	5001130205	N	1	25
110215	4	4	09/10/91	15	12918	SG	FABRICIA SABELLA	5001701301	N	7	175
110215	4	4	09/10/91	15	12918	SG	GASTROPODA	51	N	4	100
110215	4	4	09/10/91	15	12918	SG	HIATELLA SP.	5517060299	N	1	25
110215	4	4	09/10/91	15	12918	SG	LACUNA VINCTA	5103090305	N	2	50
110215	4	4	09/10/91	15	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110215	4	4	09/10/91	15	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	3	75
110215	4	4	09/10/91	15	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110215	4	4	09/10/91	15	12918	SG	LEUCON AMERICANUS	6154040110	N	6	150
110215	4	4	09/10/91	15	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110215	4	4	09/10/91	15	12918	SG	MACOMA SP.	5515310199	N	4	100
110215	4	4	09/10/91	15	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110215	4	4	09/10/91	15	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	6	150
110215	4	4	09/10/91	15	12918	SG	MICRODEUTOPUS SP.	6169060499	N	4	100
110215	4	4	09/10/91	15	12918	SG	MYA ARENARIA	5517010201	N	2	50
110215	4	4	09/10/91	15	12918	SG	MYTILIDAE	5507010000	N	73	1825
110215	4	4	09/10/91	15	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110215	4	4	09/10/91	15	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110215	4	4	09/10/91	15	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110215	4	4	09/10/91	15	12918	SG	OLIGOCHAETA	5004000000	N	925	23125
110215	4	4	09/10/91	15	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110215	4	4	09/10/91	15	12918	SG	POLYDORA CORNUTA	5001430498	N	11	275
110215	4	4	09/10/91	15	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	1	25
110215	4	4	09/10/91	15	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110215	4	4	09/10/91	15	12918	SG	SOLEMYA SP.	5504010199	N	1	25
110215	4	4	09/10/91	15	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	298	7450
110215	4	4	09/10/91	15	12918	SG	TELLINA AGILIS	5515310205	N	9	225

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110216	1	1	09/10/91	11	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	20	500
110216	1	1	09/10/91	11	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110216	1	1	09/10/91	11	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	3	75
110216	1	1	09/10/91	11	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110216	1	1	09/10/91	11	12918	SG	CAPITELLA CAPITATA	5001600101	N	9	225
110216	1	1	09/10/91	11	12918	SG	CIRRATULIDAE	5001500000	N	10	250
110216	1	1	09/10/91	11	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110216	1	1	09/10/91	11	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110216	1	1	09/10/91	11	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110216	1	1	09/10/91	11	12918	SG	ETEONE LONGA	5001130205	N	2	50
110216	1	1	09/10/91	11	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	1	25
110216	1	1	09/10/91	11	12918	SG	LACUNAVINCTA	5103090305	N	5	125
110216	1	1	09/10/91	11	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110216	1	1	09/10/91	11	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110216	1	1	09/10/91	11	12918	SG	MINUSPIO SP.	5001432699	N	3	75
110216	1	1	09/10/91	11	12918	SG	MYTILIDAE	5507010000	N	94	2350
110216	1	1	09/10/91	11	12918	SG	NEANTHES VIRENS	5001240302	N	6	150
110216	1	1	09/10/91	11	12918	SG	NEREIDAE	500124	N	1	25
110216	1	1	09/10/91	11	12918	SG	OLIGOCHAETA	5004000000	N	623	15575
110216	1	1	09/10/91	11	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110216	1	1	09/10/91	11	12918	SG	POLYDORA CORNUTA	5001430498	N	6	150
110216	1	1	09/10/91	11	12918	SG	SCOLETOMA HEBES	5001319898	N	2	50
110216	1	1	09/10/91	11	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	17	425
110216	1	1	09/10/91	11	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110216	1	1	09/10/91	11	12918	SG	TEREBELLIDAE	500168	N	1	25
110216	2	2	09/10/91	11	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	13	325
110216	2	2	09/10/91	11	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110216	2	2	09/10/91	11	12918	SG	AMPELISCA SP.	6169020199	N	3	75
110216	2	2	09/10/91	11	12918	SG	CAPITELLA CAPITATA	5001600101	N	3	75
110216	2	2	09/10/91	11	12918	SG	CIRRATULIDAE	5001500000	N	2	50
110216	2	2	09/10/91	11	12918	SG	ETEONE SP.	5001130299	N	1	25
110216	2	2	09/10/91	11	12918	SG	LACUNA VINCTA	5103090305	N	1	25
110216	2	2	09/10/91	11	12918	SG	MYTILIDAE	5507010000	N	12	300
110216	2	2	09/10/91	11	12918	SG	NEPHTYS CAECA	5001250103	N	1	25
110216	2	2	09/10/91	11	12918	SG	NEPHTYS CILIATA	5001250102	N	5	125
110216	2	2	09/10/91	11	12918	SG	OLIGOCHAETA	5004000000	N	94	2350
110216	2	2	09/10/91	11	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110216	2	2	09/10/91	11	12918	SG	POLYDORA CORNUTA	5001430498	N	4	100
110216	2	2	09/10/91	11	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110216	2	2	09/10/91	11	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	6	150
110216	2	2	09/10/91	11	12918	SG	TELLINAAGILIS	5515310205	N	1	25
110216	3	3	09/10/91	11	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	10	250
110216	3	3	09/10/91	11	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110216	3	3	09/10/91	11	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	4	100
110216	3	3	09/10/91	11	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	7	175
110216	3	3	09/10/91	11	12918	SG	BIVALVIA	55	N	1	25
110216	3	3	09/10/91	11	12918	SG	CALYCELLA SYRINGA	3704019898	C		
110216	3	3	09/10/91	11	12918	SG	CAPITELLA CAPITATA	5001600101	N	9	225
110216	3	3	09/10/91	11	12918	SG	CIRRATULIDAE	5001500000	N	30	750
110216	3	3	09/10/91	11	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110216	3	3	09/10/91	11	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110216	3	3	09/10/91	11	12918	SG	EUDENDRIUM SP.	3703080199	C		
110216	3	3	09/10/91	11	12918	SG	GASTROPODA	51	N	5	125
110216	3	3	09/10/91	11	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110216	3	3	09/10/91	11	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110216	3	3	09/10/91	11	12918	SG	MYTILIDAE	5507010000	N	32	800
110216	3	3	09/10/91	11	12918	SG	NEPHTY SCILIATA	5001250102	N	1	25
110216	3	3	09/10/91	11	12918	SG	NEREIDAE	500124	N	1	25
110216	3	3	09/10/91	11	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110216	3	3	09/10/91	11	12918	SG	OLIGOCHAETA	5004000000	N	254	6350
110216	3	3	09/10/91	11	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	1	25
110216	3	3	09/10/91	11	12918	SG	OWENIIDAE	500164	N	1	25
110216	3	3	09/10/91	11	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110216	3	3	09/10/91	11	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	2	50
110216	3	3	09/10/91	11	12918	SG	POLYDORA CORNUTA	5001430498	N	8	200
110216	3	3	09/10/91	11	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110216	3	3	09/10/91	11	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110216	3	3	09/10/91	11	12918	SG	SPIONIDAE	500143	N	1	25
110216	3	3	09/10/91	11	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	9	225
110216	3	3	09/10/91	11	12918	SG	TELLINA AGILIS	5515310205	N	6	150
110216	4	4	09/10/91	11	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	9	225
110216	4	4	09/10/91	11	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110216	4	4	09/10/91	11	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110216	4	4	09/10/91	11	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110216	4	4	09/10/91	11	12918	SG	CIRRATULIDAE	5001500000	N	14	350
110216	4	4	09/10/91	11	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110216	4	4	09/10/91	11	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	13	325
110216	4	4	09/10/91	11	12918	SG	COROPHIUM SP.	6169150299	N	2	50
110216	4	4	09/10/91	11	12918	SG	DENDROBEANIA MURRAYANA	7815250201	C		
110216	4	4	09/10/91	11	12918	SG	ETEONE LONGA	5001130205	N	1	25
110216	4	4	09/10/91	11	12918	SG	FABRICIA SABELLA	5001701301	N	2	50
110216	4	4	09/10/91	11	12918	SG	HIATELLA SP.	5517060299	N	1	25
110216	4	4	09/10/91	11	12918	SG	IDOTEA BALTHICA	6162020308	N	1	25
110216	4	4	09/10/91	11	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110216	4	4	09/10/91	11	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110216	4	4	09/10/91	11	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110216	4	4	09/10/91	11	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	2	50

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110216	4	4	09/10/91	11	12918	SG	MICRODEUTOPUS SP.	6169060499	N	1	25
110216	4	4	09/10/91	11	12918	SG	MYTILIDAE	5507010000	N	48	1200
110216	4	4	09/10/91	11	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110216	4	4	09/10/91	11	12918	SG	NEPHTYSCILIATA	5001250102	N	4	100
110216	4	4	09/10/91	11	12918	SG	OLIGOCHAETA	5004000000	N	189	4725
110216	4	4	09/10/91	11	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110216	4	4	09/10/91	11	12918	SG	PARACAPRELLA TENUIS	6171010901	N	1	25
110216	4	4	09/10/91	11	12918	SG	PHOLOE MINUTA	5001060101	N	3	75
110216	4	4	09/10/91	11	12918	SG	PHOTISMA CROCOXA	6169260208	N	2	50
110216	4	4	09/10/91	11	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110216	4	4	09/10/91	11	12918	SG	POLYDORA CORNUTA	5001430498	N	8	200
110216	4	4	09/10/91	11	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110216	4	4	09/10/91	11	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110216	4	4	09/10/91	11	12918	SG	SPIONIDAE	500143	N	1	25
110216	4	4	09/10/91	11	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	21	525
110216	4	4	09/10/91	11	12918	SG	TUBULARIA SP.	3703030299	C		
110217	1	1	09/10/91	17	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	14	350
110217	1	1	09/10/91	17	12918	SG	ALDERIA MODESTA	5123069898	N	1	25
110217	1	1	09/10/91	17	12918	SG	ALVANIA SP.	5103200199	N	1	25
110217	1	1	09/10/91	17	12918	SG	AMPELISCA ABDITA	6169020108	N	8	200
110217	1	1	09/10/91	17	12918	SG	AMPELISCA SP.	6169020199	N	59	1475
110217	1	1	09/10/91	17	12918	SG	APLIDIUM SP.	8403020199	N	1	25
110217	1	1	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	18	450
110217	1	1	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	9	225
110217	1	1	09/10/91	17	12918	SG	BIVALVIA	55	N	3	75
110217	1	1	09/10/91	17	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110217	1	1	09/10/91	17	12918	SG	CIRRATULIDAE	5001500000	N	133	3325
110217	1	1	09/10/91	17	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110217	1	1	09/10/91	17	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110217	1	1	09/10/91	17	12918	SG	ETEONE SP.	5001130299	N	3	75
110217	1	1	09/10/91	17	12918	SG	FABRICIA SABELLA	5001701301	N	2	50
110217	1	1	09/10/91	17	12918	SG	GAMMARUS OCEANICUS	6169210711	N	1	25
110217	1	1	09/10/91	17	12918	SG	GASTROPODA	51	N	2	50
110217	1	1	09/10/91	17	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	1	25
110217	1	1	09/10/91	17	12918	SG	HIATELLA SP.	5517060299	N	1	25
110217	1	1	09/10/91	17	12918	SG	LEUCON AMERICANUS	6154040110	N	1	25
110217	1	1	09/10/91	17	12918	SG	LYONSIA HYALINA	5520050206	N	3	75
110217	1	1	09/10/91	17	12918	SG	MACOMA SP.	5515310199	N	3	75
110217	1	1	09/10/91	17	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110217	1	1	09/10/91	17	12918	SG	MICRODEUTOPUS SP.	6169060499	N	1	25
110217	1	1	09/10/91	17	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110217	1	1	09/10/91	17	12918	SG	MYTILIDAE	5507010000	N	22	550
110217	1	1	09/10/91	17	12918	SG	NEANTHES VIRENS	5001240302	N	6	150
110217	1	1	09/10/91	17	12918	SG	NEPHTYS CILIATA	5001250102	N	5	125
110217	1	1	09/10/91	17	12918	SG	NEREIDAE	500124	N	1	25
110217	1	1	09/10/91	17	12918	SG	NINOE NIGRIPES	5001310204	N	4	100
110217	1	1	09/10/91	17	12918	SG	OLIGOCHAETA	5004000000	N	1123	28075
110217	1	1	09/10/91	17	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110217	1	1	09/10/91	17	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110217	1	1	09/10/91	17	12918	SG	PHOTISMA CROCOXA	6169260208	N	1	25
110217	1	1	09/10/91	17	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	3	75
110217	1	1	09/10/91	17	12918	SG	POLYDORACORNUTA	5001430498	N	9	225
110217	1	1	09/10/91	17	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110217	1	1	09/10/91	17	12918	SG	PYGOSPIOELEGANS	5001431302	N	69	1725
110217	1	1	09/10/91	17	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110217	1	1	09/10/91	17	12918	SG	SCOLETOMA HEBES	5001319898	N	16	400
110217	1	1	09/10/91	17	12918	SG	SCOLETOMA SP.	5001319899	N	38	950
110217	1	1	09/10/91	17	12918	SG	SPIONIDAE	500143	N	3	75
110217	1	1	09/10/91	17	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1315	32875
110217	1	1	09/10/91	17	12918	SG	TELLINA AGILIS	5515310205	N	10	250
110217	2	2	09/10/91	17	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	9	225
110217	2	2	09/10/91	17	12918	SG	AMPELISCA ABDITA	6169020108	N	9	225
110217	2	2	09/10/91	17	12918	SG	AMPELISCA SP.	6169020199	N	56	1400
110217	2	2	09/10/91	17	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110217	2	2	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	14	350
110217	2	2	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	12	300
110217	2	2	09/10/91	17	12918	SG	CIRRATULIDAE	5001500000	N	37	925
110217	2	2	09/10/91	17	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110217	2	2	09/10/91	17	12918	SG	ETEONE LONGA	5001130205	N	2	50
110217	2	2	09/10/91	17	12918	SG	ETEONE SP.	5001130299	N	3	75
110217	2	2	09/10/91	17	12918	SG	GAMMARUS SP.	6169210799	N	2	50
110217	2	2	09/10/91	17	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110217	2	2	09/10/91	17	12918	SG	MEDIOMASTUS SP.	5001600499	N	9	225
110217	2	2	09/10/91	17	12918	SG	MYA ARENARIA	5517010201	N	1	25
110217	2	2	09/10/91	17	12918	SG	MYTILIDAE	5507010000	N	2	50
110217	2	2	09/10/91	17	12918	SG	NEANTHES VIRENS	5001240302	N	12	300
110217	2	2	09/10/91	17	12918	SG	NEPHTYIDAE	5001250000	N	2	50
110217	2	2	09/10/91	17	12918	SG	NEPHTY SCILIATA	5001250102	N	2	50
110217	2	2	09/10/91	17	12918	SG	NEREIDAE	500124	N	1	25
110217	2	2	09/10/91	17	12918	SG	NINOE NIGRIPES	5001310204	N	6	150
110217	2	2	09/10/91	17	12918	SG	OLIGOCHAETA	5004000000	N	1329	33225
110217	2	2	09/10/91	17	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	7	175
110217	2	2	09/10/91	17	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110217	2	2	09/10/91	17	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110217	2	2	09/10/91	17	12918	SG	PYGOSPIO ELEGANS	5001431302	N	24	600
110217	2	2	09/10/91	17	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110217	2	2	09/10/91	17	12918	SG	SCOLETOMA HEBES	5001319898	N	26	650

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110217	2	2	09/10/91	17	12918	SG	SCOLETOMA SP.	5001319899	N	24	600
110217	2	2	09/10/91	17	12918	SG	SPIOSETOSA	5001430704	N	1	25
110217	2	2	09/10/91	17	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	887	22175
110217	2	2	09/10/91	17	12918	SG	TELLINA AGILIS	5515310205	N	3	75
110217	2	2	09/10/91	17	12918	SG	TURTONIA MINUTA	5515140101	N	5	125
110217	3	3	09/10/91	17	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	16	400
110217	3	3	09/10/91	17	12918	SG	AMPELISCA ABDITA	6169020108	N	9	225
110217	3	3	09/10/91	17	12918	SG	AMPELISCA SP.	6169020199	N	65	1625
110217	3	3	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	3	75
110217	3	3	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	3	75
110217	3	3	09/10/91	17	12918	SG	CIRRATULIDAE	5001500000	N	37	925
110217	3	3	09/10/91	17	12918	SG	ETEONE SP.	5001130299	N	1	25
110217	3	3	09/10/91	17	12918	SG	LUNATIA SP.	5103760499	N	1	25
110217	3	3	09/10/91	17	12918	SG	MEDIOMASTUS SP.	5001600499	N	5	125
110217	3	3	09/10/91	17	12918	SG	MYTILIDAE	5507010000	N	5	125
110217	3	3	09/10/91	17	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	1	25
110217	3	3	09/10/91	17	12918	SG	NEANTHES VIRENS	5001240302	N	9	225
110217	3	3	09/10/91	17	12918	SG	NEPHTY SCILIATA	5001250102	N	5	125
110217	3	3	09/10/91	17	12918	SG	NEREIDAE	500124	N	1	25
110217	3	3	09/10/91	17	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110217	3	3	09/10/91	17	12918	SG	OLIGOCHAETA	5004000000	N	1277	31925
110217	3	3	09/10/91	17	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	3	75
110217	3	3	09/10/91	17	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110217	3	3	09/10/91	17	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110217	3	3	09/10/91	17	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	5	125
110217	3	3	09/10/91	17	12918	SG	PYGOSPIO ELEGANS	5001431302	N	28	700
110217	3	3	09/10/91	17	12918	SG	SCOLETOMA HEBES	5001319898	N	9	225
110217	3	3	09/10/91	17	12918	SG	SCOLETOMA SP.	5001319899	N	9	225
110217	3	3	09/10/91	17	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	711	17775
110217	3	3	09/10/91	17	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110217	4	4	09/10/91	17	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	5	125
110217	4	4	09/10/91	17	12918	SG	AMPELISCA ABDITA	6169020108	N	2	50
110217	4	4	09/10/91	17	12918	SG	AMPELISCA SP.	6169020199	N	31	775
110217	4	4	09/10/91	17	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110217	4	4	09/10/91	17	12918	SG	ANOMIA SP.	5509090299	N	1	25
110217	4	4	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	23	575
110217	4	4	09/10/91	17	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	19	475
110217	4	4	09/10/91	17	12918	SG	BIVALVIA	55	N	1	25
110217	4	4	09/10/91	17	12918	SG	CAPITELLA CAPITATA	5001600101	N	6	150
110217	4	4	09/10/91	17	12918	SG	CIRRATULIDAE	5001500000	N	55	1375
110217	4	4	09/10/91	17	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110217	4	4	09/10/91	17	12918	SG	COROPHIUM BONELLI	6169150202	N	1	25
110217	4	4	09/10/91	17	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	11	275
110217	4	4	09/10/91	17	12918	SG	COROPHIUM SP.	6169150299	N	8	200
110217	4	4	09/10/91	17	12918	SG	CREPIDULA SP.	5103640299	N	1	25
110217	4	4	09/10/91	17	12918	SG	ETEONE SP.	5001130299	N	1	25
110217	4	4	09/10/91	17	12918	SG	EULALIA VIRIDIS	5001130301	N	2	50
110217	4	4	09/10/91	17	12918	SG	GAMMARUS SP.	6169210799	N	2	50
110217	4	4	09/10/91	17	12918	SG	GASTROPODA	51	N	2	50
110217	4	4	09/10/91	17	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	2	50
110217	4	4	09/10/91	17	12918	SG	HARMOTHOE SP.	5001020899	N	1	25
110217	4	4	09/10/91	17	12918	SG	HIATELLA SP.	5517060299	N	4	100
110217	4	4	09/10/91	17	12918	SG	LACUNA VINCTA	5103090305	N	4	100
110217	4	4	09/10/91	17	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110217	4	4	09/10/91	17	12918	SG	LITTORINA LITTOREA	5103100108	N	1	25
110217	4	4	09/10/91	17	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110217	4	4	09/10/91	17	12918	SG	MACOMA SP.	5515310199	N	3	75
110217	4	4	09/10/91	17	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110217	4	4	09/10/91	17	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	7	175
110217	4	4	09/10/91	17	12918	SG	MICRODEUTOPUS SP.	6169060499	N	7	175
110217	4	4	09/10/91	17	12918	SG	MYA ARENARIA	5517010201	N	1	25
110217	4	4	09/10/91	17	12918	SG	MYTILIDAE	5507010000	N	122	3050
110217	4	4	09/10/91	17	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	1	25
110217	4	4	09/10/91	17	12918	SG	NEANTHES VIRENS	5001240302	N	7	175
110217	4	4	09/10/91	17	12918	SG	NEPHTYS CILIATA	5001250102	N	4	100
110217	4	4	09/10/91	17	12918	SG	NEREIS PELAGICA	5001240403	N	1	25
110217	4	4	09/10/91	17	12918	SG	NINOE NIGRIPES	5001310204	N	4	100
110217	4	4	09/10/91	17	12918	SG	OLIGOCHAETA	5004000000	N	1854	46350
110217	4	4	09/10/91	17	12918	SG	PHOLOE MINUTA	5001060101	N	5	125
110217	4	4	09/10/91	17	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	17	425
110217	4	4	09/10/91	17	12918	SG	POLYDORA CORNUTA	5001430498	N	6	150
110217	4	4	09/10/91	17	12918	SG	POLYDORA SOCIALIS	5001430402	N	1	25
110217	4	4	09/10/91	17	12918	SG	PRIONOSPIO SP.	5001430599	N	4	100
110217	4	4	09/10/91	17	12918	SG	PYGOSPIO ELEGANS	5001431302	N	16	400
110217	4	4	09/10/91	17	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110217	4	4	09/10/91	17	12918	SG	SCOLETOMA HEBES	5001319898	N	135	3375
110217	4	4	09/10/91	17	12918	SG	SCOLETOMA SP.	5001319899	N	61	1525
110217	4	4	09/10/91	17	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1327	33175
110217	4	4	09/10/91	17	12918	SG	TELLINAAGILIS	5515310205	N	6	150
110213	1	1	09/11/91	21	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	10	250
110213	1	1	09/11/91	21	12918	SG	AMPELISCA ABDITA	6169020108	N	11	275
110213	1	1	09/11/91	21	12918	SG	AMPELISCA SP.	6169020199	N	38	950
110213	1	1	09/11/91	21	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	9	225
110213	1	1	09/11/91	21	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110213	1	1	09/11/91	21	12918	SG	CIRRATULIDAE	5001500000	N	15	375
110213	1	1	09/11/91	21	12918	SG	CIRRATULUS GRANDIS	5001500104	N	1	25
110213	1	1	09/11/91	21	12918	SG	ETEONE LONGA	5001130205	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110213	1	1	09/11/91	21	12918	SG	ETEONE SP.	5001130299	N	1	25
110213	1	1	09/11/91	21	12918	SG	EXOGONE HEBES	5001230707	N	4	100
110213	1	1	09/11/91	21	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	1	25
110213	1	1	09/11/91	21	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110213	1	1	09/11/91	21	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	11	275
110213	1	1	09/11/91	21	12918	SG	LEUCON AMERICANUS	6154040110	N	2	50
110213	1	1	09/11/91	21	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110213	1	1	09/11/91	21	12918	SG	NEANTHES VIRENS	5001240302	N	2	50
110213	1	1	09/11/91	21	12918	SG	NEPHTYS CAECA	5001250103	N	1	25
110213	1	1	09/11/91	21	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110213	1	1	09/11/91	21	12918	SG	NEREIDAE	500124	N	1	25
110213	1	1	09/11/91	21	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110213	1	1	09/11/91	21	12918	SG	OLIGOCHAETA	5004000000	N	507	12675
110213	1	1	09/11/91	21	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	3	75
110213	1	1	09/11/91	21	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110213	1	1	09/11/91	21	12918	SG	POLYDORA CORNUTA	5001430498	N	14	350
110213	1	1	09/11/91	21	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110213	1	1	09/11/91	21	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110213	1	1	09/11/91	21	12918	SG	RHYNCHOCOELA	4300000000	N	4	100
110213	1	1	09/11/91	21	12918	SG	SCOLETOMA HEBES	5001319898	N	4	100
110213	1	1	09/11/91	21	12918	SG	SPIONIDAE	500143	N	1	25
110213	1	1	09/11/91	21	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	116	2900
110213	1	1	09/11/91	21	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110213	2	2	09/11/91	21	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	4	100
110213	2	2	09/11/91	21	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110213	2	2	09/11/91	21	12918	SG	AMPELISCA SP.	6169020199	N	17	425
110213	2	2	09/11/91	21	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110213	2	2	09/11/91	21	12918	SG	CIRRATULIDAE	5001500000	N	11	275
110213	2	2	09/11/91	21	12918	SG	EXOGONE HEBES	5001230707	N	9	225
110213	2	2	09/11/91	21	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	3	75
110213	2	2	09/11/91	21	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	22	550
110213	2	2	09/11/91	21	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110213	2	2	09/11/91	21	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110213	2	2	09/11/91	21	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110213	2	2	09/11/91	21	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110213	2	2	09/11/91	21	12918	SG	OLIGOCHAETA	5004000000	N	450	11250
110213	2	2	09/11/91	21	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110213	2	2	09/11/91	21	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110213	2	2	09/11/91	21	12918	SG	POLYDORA CORNUTA	5001430498	N	15	375
110213	2	2	09/11/91	21	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110213	2	2	09/11/91	21	12918	SG	SCOLETOMA HEBES	5001319898	N	3	75
110213	2	2	09/11/91	21	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110213	2	2	09/11/91	21	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	55	1375
110213	2	2	09/11/91	21	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110213	3	3	09/11/91	21	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	5	125
110213	3	3	09/11/91	21	12918	SG	AMPELISCA ABDITA	6169020108	N	6	150
110213	3	3	09/11/91	21	12918	SG	AMPELISCA SP.	6169020199	N	12	300
110213	3	3	09/11/91	21	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	6	150
110213	3	3	09/11/91	21	12918	SG	CIRRATULIDAE	5001500000	N	15	375
110213	3	3	09/11/91	21	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110213	3	3	09/11/91	21	12918	SG	ETEONE LONGA	5001130205	N	1	25
110213	3	3	09/11/91	21	12918	SG	EXOGONE HEBES	5001230707	N	3	75
110213	3	3	09/11/91	21	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	4	100
110213	3	3	09/11/91	21	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	8	200
110213	3	3	09/11/91	21	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110213	3	3	09/11/91	21	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110213	3	3	09/11/91	21	12918	SG	NEPHTY SCILIATA	5001250102	N	1	25
110213	3	3	09/11/91	21	12918	SG	NEPHTY SINCISA	5001250115	N	1	25
110213	3	3	09/11/91	21	12918	SG	NEREIDAE	500124	N	2	50
110213	3	3	09/11/91	21	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110213	3	3	09/11/91	21	12918	SG	OLIGOCHAETA	5004000000	N	405	10125
110213	3	3	09/11/91	21	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110213	3	3	09/11/91	21	12918	SG	POLYDORA CORNUTA	5001430498	N	44	1100
110213	3	3	09/11/91	21	12918	SG	PYGOSPIO ELEGANS	5001431302	N	13	325
110213	3	3	09/11/91	21	12918	SG	SCOLETOMA HEBES	5001319898	N	3	75
110213	3	3	09/11/91	21	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110213	3	3	09/11/91	21	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110213	3	3	09/11/91	21	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	102	2550
110213	3	3	09/11/91	21	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110213	4	4	09/11/91	21	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	5	125
110213	4	4	09/11/91	21	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110213	4	4	09/11/91	21	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110213	4	4	09/11/91	21	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110213	4	4	09/11/91	21	12918	SG	CIRRATULIDAE	5001500000	N	8	200
110213	4	4	09/11/91	21	12918	SG	CIRRATULUS GRANDIS	5001500104	N	1	25
110213	4	4	09/11/91	21	12918	SG	EXOGONE HEBES	5001230707	N	2	50
110213	4	4	09/11/91	21	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110213	4	4	09/11/91	21	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	11	275
110213	4	4	09/11/91	21	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110213	4	4	09/11/91	21	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110213	4	4	09/11/91	21	12918	SG	MYTILIDAE	5507010000	N	1	25
110213	4	4	09/11/91	21	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110213	4	4	09/11/91	21	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110213	4	4	09/11/91	21	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110213	4	4	09/11/91	21	12918	SG	NEREIDAE	500124	N	1	25
110213	4	4	09/11/91	21	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110213	4	4	09/11/91	21	12918	SG	OLIGOCHAETA	5004000000	N	167	4175

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110213	4	4	09/11/91	21	12918	SG	POLYDORA CORNUTA	5001430498	N	20	500
110213	4	4	09/11/91	21	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110213	4	4	09/11/91	21	12918	SG	SCOLETOMA HEBES	5001319898	N	3	75
110213	4	4	09/11/91	21	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	33	825
110213	4	4	09/11/91	21	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110218	1	1	09/11/91	12	12918	SG	AMPELISCA ABDITA	6169020108	N	323	8075
110218	1	1	09/11/91	12	12918	SG	AMPELISCA SP.	6169020199	N	101	2525
110218	1	1	09/11/91	12	12918	SG	AMPHARETE ARCTICA	5001670201	N	1	25
110218	1	1	09/11/91	12	12918	SG	NAITIDES MUCOSA	5001130104	N	6	150
110218	1	1	09/11/91	12	12918	SG	ANAITIDES SP.	5001130199	N	2	50
110218	1	1	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1046	26150
110218	1	1	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	100	2500
110218	1	1	09/11/91	12	12918	SG	BRADA SP.	5001540199	N	2	50
110218	1	1	09/11/91	12	12918	SG	CANCER IRRORATUS	6188030108	N	1	25
110218	1	1	09/11/91	12	12918	SG	CERASTO DERMAPINNULATUM	5515220601	N	2	50
110218	1	1	09/11/91	12	12918	SG	CIRRATULIDAE	5001500000	N	472	11800
110218	1	1	09/11/91	12	12918	SG	CLYMENELLA TORQUATA	5001630202	N	11	275
110218	1	1	09/11/91	12	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110218	1	1	09/11/91	12	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110218	1	1	09/11/91	12	12918	SG	ETEONE LONGA	5001130205	N	1	25
110218	1	1	09/11/91	12	12918	SG	ETEONE SP.	5001130299	N	3	75
110218	1	1	09/11/91	12	12918	SG	EXOGONE HEBES	5001230707	N	6	150
110218	1	1	09/11/91	12	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	2	50
110218	1	1	09/11/91	12	12918	SG	HARMOTHOE SP.	5001020899	N	1	25
110218	1	1	09/11/91	12	12918	SG	HOLOTHUROIDEA	8170	N	1	25
110218	1	1	09/11/91	12	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	19	475
110218	1	1	09/11/91	12	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	11	275
110218	1	1	09/11/91	12	12918	SG	LYONSIA HYALINA	5520050206	N	3	75
110218	1	1	09/11/91	12	12918	SG	LYONSIA SP.	5520050299	N	4	100
110218	1	1	09/11/91	12	12918	SG	MALDANIDAE	500163	N	2	50
110218	1	1	09/11/91	12	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110218	1	1	09/11/91	12	12918	SG	MICRODEUTOPUS SP.	6169060499	N	1	25
110218	1	1	09/11/91	12	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110218	1	1	09/11/91	12	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110218	1	1	09/11/91	12	12918	SG	MYA ARENARIA	5517010201	N	2	50
110218	1	1	09/11/91	12	12918	SG	MYTILIDAE	5507010000	N	19	475
110218	1	1	09/11/91	12	12918	SG	NEPHTYIDAE	5001250000	N	11	275
110218	1	1	09/11/91	12	12918	SG	NEREIDAE	500124	N	1	25
110218	1	1	09/11/91	12	12918	SG	NINOE NIGRIPES	5001310204	N	8	200
110218	1	1	09/11/91	12	12918	SG	NUCULA DELPHINODONTA	5502020206	N	3	75
110218	1	1	09/11/91	12	12918	SG	OLIGOCHAETA	5004000000	N	320	8000
110218	1	1	09/11/91	12	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	37	925
110218	1	1	09/11/91	12	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	4	100
110218	1	1	09/11/91	12	12918	SG	PARAONIS GRACILIS	5001410301	N	2	50
110218	1	1	09/11/91	12	12918	SG	PHERUSA AFFINIS	5001540304	N	2	50
110218	1	1	09/11/91	12	12918	SG	PHOLOE MINUTA	5001060101	N	6	150
110218	1	1	09/11/91	12	12918	SG	PHORONIS SP.	7700010299	N	4	100
110218	1	1	09/11/91	12	12918	SG	PHOTISMA CROCOXA	6169260208	N	7	175
110218	1	1	09/11/91	12	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	11	275
110218	1	1	09/11/91	12	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110218	1	1	09/11/91	12	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	6	150
110218	1	1	09/11/91	12	12918	SG	POLYDORA SOCIALIS	5001430402	N	3	75
110218	1	1	09/11/91	12	12918	SG	PRIONOSPIO SP.	5001430599	N	3	75
110218	1	1	09/11/91	12	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	23	575
110218	1	1	09/11/91	12	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110218	1	1	09/11/91	12	12918	SG	RHYNCHOCOELA	4300000000	N	14	350
110218	1	1	09/11/91	12	12918	SG	SCOLETOMA HEBES	5001319898	N	139	3475
110218	1	1	09/11/91	12	12918	SG	SCOLETOMA SP.	5001319899	N	38	950
110218	1	1	09/11/91	12	12918	SG	SOLEMYA VELUM	5504010101	N	1	25
110218	1	1	09/11/91	12	12918	SG	SPIO SETOSA	5001430704	N	12	300
110218	1	1	09/11/91	12	12918	SG	SPIOPHANES BOMBYX	5001431001	N	8	200
110218	1	1	09/11/91	12	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110218	1	1	09/11/91	12	12918	SG	TELLINA AGILIS	5515310205	N	14	350
110218	1	1	09/11/91	12	12918	SG	TEREBELLIDAE	500168	N	1	25
110218	1	1	09/11/91	12	12918	SG	TURBELLARIA	3901000000	N.	15	375
110218	1	1	09/11/91	12	12918	SG	UNCIOLA IRRORATA	6169150703	N	2	50
110218	2	2	09/11/91	12	12918	SG	AMPELISCA ABDITA	6169020108	N	280	7000
110218	2	2	09/11/91	12	12918	SG	AMPELISCA SP.	6169020199	N	132	3300
110218	2	2	09/11/91	12	12918	SG	AMPHARETE ARCTICA	5001670201	N	1	25
110218	2	2	09/11/91	12	12918	SG	NAITIDES MUCOSA	5001130104	N	4	100
110218	2	2	09/11/91	12	12918	SG	ANOMIA SP.	5509090299	N	5	125
110218	2	2	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1479	36975
110218	2	2	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	37	925
110218	2	2	09/11/91	12	12918	SG	ASTARTE SP.	5515190199	N	1	25
110218	2	2	09/11/91	12	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110218	2	2	09/11/91	12	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	5	125
110218	2	2	09/11/91	12	12918	SG	CHIRIDOTEA TUFTSI	6162020503	N	1	25
110218	2	2	09/11/91	12	12918	SG	CIRRATULIDAE	5001500000	N	234	5850
110218	2	2	09/11/91	12	12918	SG	CLYMENELLA TORQUATA	5001630202	N	25	625
110218	2	2	09/11/91	12	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110218	2	2	09/11/91	12	12918	SG	ETEONE LONGA	5001130205	N	1	25
110218	2	2	09/11/91	12	12918	SG	ETEONE SP.	5001130299	N	1	25
110218	2	2	09/11/91	12	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110218	2	2	09/11/91	12	12918	SG	GASTROPODA	51	N	6	150
110218	2	2	09/11/91	12	12918	SG	HARMOTHOE SP.	5001020899	N	2	50
110218	2	2	09/11/91	12	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110218	2	2	09/11/91	12	12918	SG	HOLOTHUROIDEA	8170	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110218	2	2	09/11/91	12	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	17	425
110218	2	2	09/11/91	12	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	2	50
110218	2	2	09/11/91	12	12918	SG	LYONSIA HYALINA	5520050206	N	9	225
110218	2	2	09/11/91	12	12918	SG	LYONSIA SP.	5520050299	N	1	25
110218	2	2	09/11/91	12	12918	SG	MALDANIDAE	500163	N	3	75
110218	2	2	09/11/91	12	12918	SG	MEDIOMASTUS SP.	5001600499	N	8	200
110218	2	2	09/11/91	12	12918	SG	MYTILIDAE	5507010000	N	4	100
110218	2	2	09/11/91	12	12918	SG	NEPHTYIDAE	5001250000	N	9	225
110218	2	2	09/11/91	12	12918	SG	NINOE NIGRIPES	5001310204	N	8	200
110218	2	2	09/11/91	12	12918	SG	NUCULADELPHINODONTA	5502020206	N	4	100
110218	2	2	09/11/91	12	12918	SG	NUCULA SP.	5502020299	N	1	25
110218	2	2	09/11/91	12	12918	SG	OLIGOCHAETA	5004000000	N	412	10300
110218	2	2	09/11/91	12	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	38	950
110218	2	2	09/11/91	12	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	12	300
110218	2	2	09/11/91	12	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110218	2	2	09/11/91	12	12918	SG	PHOLOE MINUTA	5001060101	N	18	450
110218	2	2	09/11/91	12	12918	SG	PHORONIS SP.	7700010299	N	3	75
110218	2	2	09/11/91	12	12918	SG	PHOTISMA CROCOXA	6169260208	N	3	75
110218	2	2	09/11/91	12	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	10	250
110218	2	2	09/11/91	12	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110218	2	2	09/11/91	12	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	7	175
110218	2	2	09/11/91	12	12918	SG	POLYDORA SOCIALIS	5001430402	N	1	25
110218	2	2	09/11/91	12	12918	SG	PRIONOSPIO SP.	5001430599	N	16	400
110218	2	2	09/11/91	12	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	28	700
110218	2	2	09/11/91	12	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110218	2	2	09/11/91	12	12918	SG	RHYNCHOCOELA	4300000000	N	10	250
110218	2	2	09/11/91	12	12918	SG	SCOLETOMA HEBES	5001319898	N	222	5550
110218	2	2	09/11/91	12	12918	SG	SCOLETOMA SP.	5001319899	N	15	375
110218	2	2	09/11/91	12	12918	SG	SPIOSETOSA	5001430704	N	20	500
110218	2	2	09/11/91	12	12918	SG	SPIONIDAE	500143	N	1	25
110218	2	2	09/11/91	12	12918	SG	SPIOPHANES BOMBYX	5001431001	N	3	75
110218	2	2	09/11/91	12	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2	50
110218	2	2	09/11/91	12	12918	SG	TELLINA AGILIS	5515310205	N	65	1625
110218	2	2	09/11/91	12	12918	SG	TEREBELLIDAE	500168	N	1	25
110218	2	2	09/11/91	12	12918	SG	TURBELLARIA	3901000000	N	19	475
110218	2	2	09/11/91	12	12918	SG	UNCIOLA IRRORATA	6169150703	N	6	150
110218	3	3	09/11/91	12	12918	SG	AMPELISCA ABDITA	6169020108	N	92	2300
110218	3	3	09/11/91	12	12918	SG	AMPELISCA SP.	6169020199	N	78	1950
110218	3	3	09/11/91	12	12918	SG	AMPHARETE ARCTICA	5001670201	N	5	125
110218	3	3	09/11/91	12	12918	SG	NAITIDES MUCOSA	5001130104	N	1	25
110218	3	3	09/11/91	12	12918	SG	ANOMIA SP.	5509090299	N	17	425
110218	3	3	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	540	13500
110218	3	3	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	177	4425
110218	3	3	09/11/91	12	12918	SG	BIVALVIA	55	N	1	25
110218	3	3	09/11/91	12	12918	SG	CAPITELLA CAPITATA	5001600101	N	3	75
110218	3	3	09/11/91	12	12918	SG	CERASTODERMAPINNULATUM	5515220601	N	4	100
110218	3	3	09/11/91	12	12918	SG	CIRRATULIDAE	5001500000	N	263	6575
110218	3	3	09/11/91	12	12918	SG	CLYMENELLA TORQUATA	5001630202	N	113	2825
110218	3	3	09/11/91	12	12918	SG	EDOTEA TRILOBA	6162020798	N	4	100
110218	3	3	09/11/91	12	12918	SG	ETEONE LONGA	5001130205	N	1	25
110218	3	3	09/11/91	12	12918	SG	ETEONE SP.	5001130299	N	2	50
110218	3	3	09/11/91	12	12918	SG	EXOGONE HEBES	5001230707	N	10	250
110218	3	3	09/11/91	12	12918	SG	GASTROPODA	51	N	4	100
110218	3	3	09/11/91	12	12918	SG	HOLOTHUROIDEA	8170	N	1	25
110218	3	3	09/11/91	12	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	9	225
110218	3	3	09/11/91	12	12918	SG	LYONSIA HYALINA	5520050206	N	5	125
110218	3	3	09/11/91	12	12918	SG	LYONSIA SP.	5520050299	N	2	50
110218	3	3	09/11/91	12	12918	SG	MALDANIDAE	500163	N	10	250
110218	3	3	09/11/91	12	12918	SG	MEDIOMASTUS SP.	5001600499	N	5	125
110218	3	3	09/11/91	12	12918	SG	MUNNA SP.	6163120199	N	1	25
110218	3	3	09/11/91	12	12918	SG	MYA ARENARIA	5517010201	N	2	50
110218	3	3	09/11/91	12	12918	SG	NEPHTYIDAE	5001250000	N	2	50
110218	3	3	09/11/91	12	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110218	3	3	09/11/91	12	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110218	3	3	09/11/91	12	12918	SG	NUCULA DELPHINODONTA	5502020206	N	11	275
110218	3	3	09/11/91	12	12918	SG	OLIGOCHAETA	5004000000	N	320	8000
110218	3	3	09/11/91	12	12918	SG	OPHELINA ACUMINATA	5001580698	N	1	25
110218	3	3	09/11/91	12	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	41	1025
110218	3	3	09/11/91	12	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	25	625
110218	3	3	09/11/91	12	12918	SG	PHOLOE MINUTA	5001060101	N	5	125
110218	3	3	09/11/91	12	12918	SG	PHORONIS SP.	7700010299	N	5	125
110218	3	3	09/11/91	12	12918	SG	PHOTISMA CROCOXA	6169260208	N	4	100
110218	3	3	09/11/91	12	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	15	375
110218	3	3	09/11/91	12	12918	SG	PRIONOSPIO SP.	5001430599	N	14	350
110218	3	3	09/11/91	12	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	11	275
110218	3	3	09/11/91	12	12918	SG	RHYNCHOCOELA	4300000000	N	8	200
110218	3	3	09/11/91	12	12918	SG	SCOLETOMA HEBES	5001319898	N	89	2225
110218	3	3	09/11/91	12	12918	SG	SCOLETOMA SP.	5001319899	N	64	1600
110218	3	3	09/11/91	12	12918	SG	SPIO SETOSA	5001430704	N	13	325
110218	3	3	09/11/91	12	12918	SG	SPIOPHANES BOMBYX	5001431001	N	3	75
110218	3	3	09/11/91	12	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2	50
110218	3	3	09/11/91	12	12918	SG	TELLINA AGILIS	5515310205	N	30	750
110218	3	3	09/11/91	12	12918	SG	TURBELLARIA	3901000000	N	11	275
110218	4	4	09/11/91	12	12918	SG	AMPELISCA ABDITA	6169020108	N	383	9575
110218	4	4	09/11/91	12	12918	SG	AMPELISCA SP.	6169020199	N	184	4600
110218	4	4	09/11/91	12	12918	SG	NAITIDES MACULATA	5001130106	N	1	25
110218	4	4	09/11/91	12	12918	SG	NAITIDES MUCOSA	5001130104	N	3	75

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110218	4	4	09/11/91	12	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110218	4	4	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1159	28975
110218	4	4	09/11/91	12	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	58	1450
110218	4	4	09/11/91	12	12918	SG	ASABELLIDES OCULATA	5001670802	N	1	25
110218	4	4	09/11/91	12	12918	SG	BOWERBANKIA GRACILIS	7805010201	C		
110218	4	4	09/11/91	12	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110218	4	4	09/11/91	12	12918	SG	CERASTO DERMAPINNULATUM	5515220601	N	11	275
110218	4	4	09/11/91	12	12918	SG	CIRRATULIDAE	5001500000	N	813	20325
110218	4	4	09/11/91	12	12918	SG	CLYMENELLA TORQUATA	5001630202	N	47	1175
110218	4	4	09/11/91	12	12918	SG	CRANGON SEPTEMSPINOSA	6179220103	N	1	25
110218	4	4	09/11/91	12	12918	SG	CUMACEA	6154	N	1	25
110218	4	4	09/11/91	12	12918	SG	DYNAMENA PUMILA	3704050697	C		
110218	4	4	09/11/91	12	12918	SG	EDOTEA TRILOBA	6162020798	N	6	150
110218	4	4	09/11/91	12	12918	SG	ETEONE LONGA	5001130205	N	2	50
110218	4	4	09/11/91	12	12918	SG	ETEONE SP.	5001130299	N	3	75
110218	4	4	09/11/91	12	12918	SG	EUCLYMENE ZONALIS	5001631103	N	1	25
110218	4	4	09/11/91	12	12918	SG	EUDENDRIUM DISPAR	3703080198	C		
110218	4	4	09/11/91	12	12918	SG	EXOGONE HEBES	5001230707	N	5	125
110218	4	4	09/11/91	12	12918	SG	HARMOTHOE SP.	5001020899	N	2	50
110218	4	4	09/11/91	12	12918	SG	HIATELLA SP.	5517060299	N	1	25
110218	4	4	09/11/91	12	12918	SG	HOLOTHUROIDEA	8170	N	2	50
110218	4	4	09/11/91	12	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	4	100
110218	4	4	09/11/91	12	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110218	4	4	09/11/91	12	12918	SG	LEUCON AMERICANUS	6154040110	N	2	50
110218	4	4	09/11/91	12	12918	SG	LYONSIA HYALINA	5520050206	N	5	125
110218	4	4	09/11/91	12	12918	SG	LYONSIA SP.	5520050299	N	1	25
110218	4	4	09/11/91	12	12918	SG	MALDANIDAE	500163	N	2	50
110218	4	4	09/11/91	12	12918	SG	MEDIOMASTUS SP.	5001600499	N	12	300
110218	4	4	09/11/91	12	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110218	4	4	09/11/91	12	12918	SG	MYA ARENARIA	5517010201	N	2	50
110218	4	4	09/11/91	12	12918	SG	MYTILIDAE	5507010000	N	70	1750
110218	4	4	09/11/91	12	12918	SG	NEPHTYIDAE	5001250000	N	7	175
110218	4	4	09/11/91	12	12918	SG	NEPHTYSCILIATA	5001250102	N	1	25
110218	4	4	09/11/91	12	12918	SG	NEPHTYS INCISA	5001250115	N	2	50
110218	4	4	09/11/91	12	12918	SG	NINOE NIGRIPES	5001310204	N	5	125
110218	4	4	09/11/91	12	12918	SG	NUCULA DELPHINODONTA	5502020206	N	7	175
110218	4	4	09/11/91	12	12918	SG	OBELIA DICHOTOMA	3704010205	C		
110218	4	4	09/11/91	12	12918	SG	OLIGOCHAETA	5004000000	N	327	8175
110218	4	4	09/11/91	12	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	31	775
110218	4	4	09/11/91	12	12918	SG	OWENIA FUSIFORMIS	5001640102	N	3	75
110218	4	4	09/11/91	12	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	29	725
110218	4	4	09/11/91	12	12918	SG	PHERUSA AFFINIS	5001540304	N	7	175
110218	4	4	09/11/91	12	12918	SG	PHOLOE MINUTA	5001060101	N	14	350
110218	4	4	09/11/91	12	12918	SG	PHORONIS SP.	7700010299	N	8	200
110218	4	4	09/11/91	12	12918	SG	PHOTISMA CROCOXA	6169260208	N	11	275
110218	4	4	09/11/91	12	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	14	350
110218	4	4	09/11/91	12	12918	SG	POLYCIRRUS SP.	5001680899	N	1	25
110218	4	4	09/11/91	12	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	5	125
110218	4	4	09/11/91	12	12918	SG	POLYDORA SOCIALIS	5001430402	N	1	25
110218	4	4	09/11/91	12	12918	SG	PRIONOSPIO SP.	5001430599	N	17	425
110218	4	4	09/11/91	12	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	12	300
110218	4	4	09/11/91	12	12918	SG	PYGOSPIO ELEGANS	5001431302	N	5	125
110218	4	4	09/11/91	12	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110218	4	4	09/11/91	12	12918	SG	SCOLETOMA HEBES	5001319898	N	251	6275
110218	4	4	09/11/91	12	12918	SG	SCOLETOMA SP.	5001319899	N	32	800
110218	4	4	09/11/91	12	12918	SG	SOLENIDAE	551529	N	4	100
110218	4	4	09/11/91	12	12918	SG	SPIO SETOSA	5001430704	N	12	300
110218	4	4	09/11/91	12	12918	SG	SPIONIDAE	500143	N	2	50
110218	4	4	09/11/91	12	12918	SG	SPIOPHANES BOMBYX	5001431001	N	8	200
110218	4	4	09/11/91	12	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	1	25
110218	4	4	09/11/91	12	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	23	575
110218	4	4	09/11/91	12	12918	SG	TELLINA AGILIS	5515310205	N	54	1350
110218	4	4	09/11/91	12	12918	SG	TURBELLARIA	3901000000	N	8	200
110218	4	4	09/11/91	12	12918	SG	UNCIOLA IRRORATA	6169150703	N	5	125
110219	1	1	09/11/91	13	12918	SG	AMPELISCA ABDITA	6169020108	N	2	50
110219	1	1	09/11/91	13	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110219	1	1	09/11/91	13	12918	SG	CIRRATULIDAE	5001500000	N	17	425
110219	1	1	09/11/91	13	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110219	1	1	09/11/91	13	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110219	1	1	09/11/91	13	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110219	1	1	09/11/91	13	12918	SG	MYTILIDAE	5507010000	N	47	1175
110219	1	1	09/11/91	13	12918	SG	OLIGOCHAETA	5004000000	N	3	75
110219	1	1	09/11/91	13	12918	SG	PHOXICHILIDIUM FEMORATUM	6001060102	N	5	125
110219	1	1	09/11/91	13	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	20	500
110219	1	1	09/11/91	13	12918	SG	UNCIOLA SP.	6169150799	N	1	25
110219	2	2	09/11/91	13	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110219	2	2	09/11/91	13	12918	SG	ANOMIA SP.	5509090299	N	9	225
110219	2	2	09/11/91	13	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	4	100
110219	2	2	09/11/91	13	12918	SG	BALANUS CRENATUS	6134020104	N	1	25
110219	2	2	09/11/91	13	12918	SG	CALLOPORA AURITA	7815080101	C		
110219	2	2	09/11/91	13	12918	SG	CAPITELLA CAPITATA	5001600101	N	8	200
110219	2	2	09/11/91	13	12918	SG	CIRRATULIDAE	5001500000	N	2	50
110219	2	2	09/11/91	13	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110219	2	2	09/11/91	13	12918	SG	EUDENDRIUM DISPAR	3703080198	C		
110219	2	2	09/11/91	13	12918	SG	HALICHONDRIA PANICEA	3665020202	C		
110219	2	2	09/11/91	13	12918	SG	ISODICTYA DEICHMANNE	3663989898	C		
110219	2	2	09/11/91	13	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110219	2	2	09/11/91	13	12918	SG	OLIGOCHAETA	5004000000	N	13	325
110219	2	2	09/11/91	13	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110219	2	2	09/11/91	13	12918	SG	SCOLETOMA HEBES	5001319898	N	1	25
110219	2	2	09/11/91	13	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	5	125
110219	3	3	09/11/91	13	12918	SG	ACHELIA SPINOSA	6001040202	N	2	50
110219	3	3	09/11/91	13	12918	SG	CAPITELLA CAPITATA	5001600101	N	8	200
110219	3	3	09/11/91	13	12918	SG	CIRRATULIDAE	5001500000	N	13	325
110219	3	3	09/11/91	13	12918	SG	EUCRATEALORICATA	7815020101	C		
110219	3	3	09/11/91	13	12918	SG	HALECIUMDIMINUTIVUM	3704060198	C		
110219	3	3	09/11/91	13	12918	SG	ISODICTYADEICHMANNE	3663989898	C		
110219	3	3	09/11/91	13	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110219	3	3	09/11/91	13	12918	SG	MYTILIDAE	5507010000	N	28	700
110219	3	3	09/11/91	13	12918	SG	OBELIA DICHOTOMA	3704010205	C		
110219	3	3	09/11/91	13	12918	SG	OBELIA GENICULATA	3704010298	C		
110219	3	3	09/11/91	13	12918	SG	OLIGOCHAETA	5004000000	N	23	575
110219	3	3	09/11/91	13	12918	SG	PHOXICHILIDIUM FEMORATUM	6001060102	N	3	75
110219	3	3	09/11/91	13	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110219	3	3	09/11/91	13	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110219	3	3	09/11/91	13	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	36	900
110219	3	3	09/11/91	13	12918	SG	TRICELLARIA PEACHII	7815280398	C		
110219	3	3	09/11/91	13	12918	SG	TUBULARIA SP.	3703030299	C		
110219	4	4	09/11/91	13	12918	SG	ALVANIA SP.	5103200199	N	1	25
110219	4	4	09/11/91	13	12918	SG	AMPELISCA ABDITA	6169020108	N	3	75
110219	4	4	09/11/91	13	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110219	4	4	09/11/91	13	12918	SG	ANOMIA SP.	5509090299	N	6	150
110219	4	4	09/11/91	13	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	61	1525
110219	4	4	09/11/91	13	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	4	100
110219	4	4	09/11/91	13	12918	SG	CALLOPORA AURITA	7815080101	C		
110219	4	4	09/11/91	13	12918	SG	CAPITELLA CAPITATA	5001600101	N	364	9100
110219	4	4	09/11/91	13	12918	SG	CIRRATULIDAE	5001500000	N	5	125
110219	4	4	09/11/91	13	12918	SG	ETEONE LONGA	5001130205	N	1	25
110219	4	4	09/11/91	13	12918	SG	ETEONE SP.	5001130299	N	3	75
110219	4	4	09/11/91	13	12918	SG	HALECIUM DIMINUTIVUM	3704060198	C		
110219	4	4	09/11/91	13	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110219	4	4	09/11/91	13	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110219	4	4	09/11/91	13	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	4	100
110219	4	4	09/11/91	13	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110219	4	4	09/11/91	13	12918	SG	MYTILIDAE	5507010000	N	12	300
110219	4	4	09/11/91	13	12918	SG	MYTILUS EDULIS	5507010101	N	2	50
110219	4	4	09/11/91	13	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110219	4	4	09/11/91	13	12918	SG	NUCULA DELPHINODONTA	5502020206	N	4	100
110219	4	4	09/11/91	13	12918	SG	OLIGOCHAETA	5004000000	N	19	475
110219	4	4	09/11/91	13	12918	SG	PHOLOE MINUTA	5001060101	N	6	150
110219	4	4	09/11/91	13	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110219	4	4	09/11/91	13	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110219	4	4	09/11/91	13	12918	SG	RHYNCHOCOELA	4300000000	N	3	75
110219	4	4	09/11/91	13	12918	SG	SCOLETOMA HEBES	5001319898	N	8	200
110219	4	4	09/11/91	13	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110219	4	4	09/11/91	13	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110219	4	4	09/11/91	13	12918	SG	SPIO SETOSA	5001430704	N	1	25
110219	4	4	09/11/91	13	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2	50
110219	4	4	09/11/91	13	12918	SG	TELLINA AGILIS	5515310205	N	11	275
110219	4	4	09/11/91	13	12918	SG	TRICELLARIA PEACHII	7815280398	C		
110219	4	4	09/11/91	13	12918	SG	TUBULARIA SP.	3703030299	C		
110220	1	1	09/11/91	10	12918	SG	AMPELISCA ABDITA	6169020108	N	136	3400
110220	1	1	09/11/91	10	12918	SG	AMPELISCA SP.	6169020199	N	195	4875
110220	1	1	09/11/91	10	12918	SG	AMPHARETE ARCTICA	5001670201	N	1	25
110220	1	1	09/11/91	10	12918	SG	ANAITIDES SP.	5001130199	N	2	50
110220	1	1	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	120	3000
110220	1	1	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	4	100
110220	1	1	09/11/91	10	12918	SG	BIVALVIA	55	N	1	25
110220	1	1	09/11/91	10	12918	SG	CANCER IRRORATUS	6188030108	N	1	25
110220	1	1	09/11/91	10	12918	SG	CERASTO DERMAPINNULATUM	5515220601	N	2	50
110220	1	1	09/11/91	10	12918	SG	CIRRATULIDAE	5001500000	N	216	5400
110220	1	1	09/11/91	10	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110220	1	1	09/11/91	10	12918	SG	COSSURA SOYERI	5001520196	N	1	25
110220	1	1	09/11/91	10	12918	SG	CUMACEA	6154	N	1	25
110220	1	1	09/11/91	10	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110220	1	1	09/11/91	10	12918	SG	ETEONE LONGA	5001130205	N	1	25
110220	1	1	09/11/91	10	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110220	1	1	09/11/91	10	12918	SG	FABRICIA SABELLA	5001701301	N	1	25
110220	1	1	09/11/91	10	12918	SG	GASTROPODA	51	N	2	50
110220	1	1	09/11/91	10	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110220	1	1	09/11/91	10	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	4	100
110220	1	1	09/11/91	10	12918	SG	LEUCON AMERICANUS	6154040110	N	2	50
110220	1	1	09/11/91	10	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110220	1	1	09/11/91	10	12918	SG	MEDIOMASTUS SP.	5001600499	N	19	475
110220	1	1	09/11/91	10	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	2	50
110220	1	1	09/11/91	10	12918	SG	MYTILIDAE	5507010000	N	21	525
110220	1	1	09/11/91	10	12918	SG	NEPHTYIDAE	5001250000	N	11	275
110220	1	1	09/11/91	10	12918	SG	NINOE NIGRIPES	5001310204	N	17	425
110220	1	1	09/11/91	10	12918	SG	NUCULA SP.	5502020299	N	1	25
110220	1	1	09/11/91	10	12918	SG	OLIGOCHAETA	5004000000	N	240	6000
110220	1	1	09/11/91	10	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	5	125
110220	1	1	09/11/91	10	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	5	125
110220	1	1	09/11/91	10	12918	SG	PHOLOE MINUTA	5001060101	N	5	125
110220	1	1	09/11/91	10	12918	SG	PHOTISMA CROCOXA	6169260208	N	7	175

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110220	1	1	09/11/91	10	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	3	75
110220	1	1	09/11/91	10	12918	SG	PRIONOSPIO SP.	5001430599	N	6	150
110220	1	1	09/11/91	10	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	15	375
110220	1	1	09/11/91	10	12918	SG	RHYNCHOCOELA	4300000000	N	26	650
110220	1	1	09/11/91	10	12918	SG	SCOLETOMA HEBES	5001319898	N	14	350
110220	1	1	09/11/91	10	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110220	1	1	09/11/91	10	12918	SG	SIPUNCULA	72	N	1	25
110220	1	1	09/11/91	10	12918	SG	SPIO SETOSA	5001430704	N	3	75
110220	1	1	09/11/91	10	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	2	50
110220	1	1	09/11/91	10	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	23	575
110220	1	1	09/11/91	10	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110220	2	2	09/11/91	10	12918	SG	AMPELISCA ABDITA	6169020108	N	89	2225
110220	2	2	09/11/91	10	12918	SG	AMPELISCA SP.	6169020199	N	124	3100
110220	2	2	09/11/91	10	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110220	2	2	09/11/91	10	12918	SG	ANOMIA SP.	5509090299	N	4	100
110220	2	2	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	32	800
110220	2	2	09/11/91	10	12918	SG	CIRRATULIDAE	5001500000	N	84	2100
110220	2	2	09/11/91	10	12918	SG	CLYMENELLA TORQUATA	5001630202	N	2	50
110220	2	2	09/11/91	10	12918	SG	COSSURA SOYERI	5001520196	N	1	25
110220	2	2	09/11/91	10	12918	SG	EDOTEA TRILOBA	6162020798	N	5	125
110220	2	2	09/11/91	10	12918	SG	ETEONE SP.	5001130299	N	2	50
110220	2	2	09/11/91	10	12918	SG	GASTROPODA	51	N	1	25
110220	2	2	09/11/91	10	12918	SG	HIATELLA SP.	5517060299	N	1	25
110220	2	2	09/11/91	10	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110220	2	2	09/11/91	10	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	3	75
110220	2	2	09/11/91	10	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110220	2	2	09/11/91	10	12918	SG	LEUCON AMERICANUS	6154040110	N	2	50
110220	2	2	09/11/91	10	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110220	2	2	09/11/91	10	12918	SG	MEDIOMASTUS SP.	5001600499	N	12	300
110220	2	2	09/11/91	10	12918	SG	MYA ARENARIA	5517010201	N	1	25
110220	2	2	09/11/91	10	12918	SG	MYTILIDAE	5507010000	N	24	600
110220	2	2	09/11/91	10	12918	SG	NEPHTYIDAE	5001250000	N	12	300
110220	2	2	09/11/91	10	12918	SG	NEPHTYS INCISA	5001250115	N	2	50
110220	2	2	09/11/91	10	12918	SG	NINOENI GRIPES	5001310204	N	23	575
110220	2	2	09/11/91	10	12918	SG	NUCULA SP.	5502020299	N	1	25
110220	2	2	09/11/91	10	12918	SG	OLIGOCHAETA	5004000000	N	154	3850
110220	2	2	09/11/91	10	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	2	50
110220	2	2	09/11/91	10	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	6	150
110220	2	2	09/11/91	10	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110220	2	2	09/11/91	10	12918	SG	PHOLOE MINUTA	5001060101	N	5	125
110220	2	2	09/11/91	10	12918	SG	PHOTISMA CROCOXA	6169260208	N	2	50
110220	2	2	09/11/91	10	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110220	2	2	09/11/91	10	12918	SG	PRIONOSPIO SP.	5001430599	N	4	100
110220	2	2	09/11/91	10	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	10	250
110220	2	2	09/11/91	10	12918	SG	RHYNCHOCOELA	4300000000	N	9	225
110220	2	2	09/11/91	10	12918	SG	SCOLETOMA HEBES	5001319898	N	7	175
110220	2	2	09/11/91	10	12918	SG	SCOLETOMA SP.	5001319899	N	5	125
110220	2	2	09/11/91	10	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	1	25
110220	2	2	09/11/91	10	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	23	575
110220	2	2	09/11/91	10	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110220	2	2	09/11/91	10	12918	SG	UNCIOLA IRRORATA	6169150703	N	1	25
110220	2	2	09/11/91	10	12918	SG	UNCIOLA SP.	6169150799	N	1	25
110220	3	3	09/11/91	10	12918	SG	AMPELISCA ABDITA	6169020108	N	89	2225
110220	3	3	09/11/91	10	12918	SG	AMPELISCA SP.	6169020199	N	140	3500
110220	3	3	09/11/91	10	12918	SG	ANOMIA SP.	5509090299	N	5	125
110220	3	3	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	7	175
110220	3	3	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110220	3	3	09/11/91	10	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	2	50
110220	3	3	09/11/91	10	12918	SG	CIRRATULIDAE	5001500000	N	38	950
110220	3	3	09/11/91	10	12918	SG	CLYMENELLA TORQUATA	5001630202	N	3	75
110220	3	3	09/11/91	10	12918	SG	EUCLYMENE ZONALIS	5001631103	N	1	25
110220	3	3	09/11/91	10	12918	SG	GASTROPODA	51	N	1	25
110220	3	3	09/11/91	10	12918	SG	LYONSIA SP.	5520050299	N	2	50
110220	3	3	09/11/91	10	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110220	3	3	09/11/91	10	12918	SG	MYTILIDAE	5507010000	N	24	600
110220	3	3	09/11/91	10	12918	SG	NEPHTYIDAE	5001250000	N	4	100
110220	3	3	09/11/91	10	12918	SG	NINOE NIGRIPES	5001310204	N	10	250
110220	3	3	09/11/91	10	12918	SG	NUCULA SP.	5502020299	N	3	75
110220	3	3	09/11/91	10	12918	SG	OLIGOCHAETA	5004000000	N	41	1025
110220	3	3	09/11/91	10	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	3	75
110220	3	3	09/11/91	10	12918	SG	ORCHOMENELLA SP.	6169345299	N	1	25
110220	3	3	09/11/91	10	12918	SG	OWENIA FUSIFORMIS	5001640102	N	1	25
110220	3	3	09/11/91	10	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110220	3	3	09/11/91	10	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110220	3	3	09/11/91	10	12918	SG	PHOTISMA CROCOXA	6169260208	N	1	25
110220	3	3	09/11/91	10	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110220	3	3	09/11/91	10	12918	SG	PRIONOSPIO SP.	5001430599	N	4	100
110220	3	3	09/11/91	10	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	3	75
110220	3	3	09/11/91	10	12918	SG	RHYNCHOCOELA	4300000000	N	6	150
110220	3	3	09/11/91	10	12918	SG	SCOLETOMA HEBES	5001319898	N	2	50
110220	3	3	09/11/91	10	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110220	3	3	09/11/91	10	12918	SG	TURBELLARIA	3901000000	N	8	200
110220	3	3	09/11/91	10	12918	SG	UNCIOLA IRRORATA	6169150703	N	1	25
110220	4	4	09/11/91	10	12918	SG	AMPELISCA ABDITA	6169020108	N	135	3375
110220	4	4	09/11/91	10	12918	SG	AMPELISCA SP.	6169020199	N	212	5300
110220	4	4	09/11/91	10	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110220	4	4	09/11/91	10	12918	SG	ANOMIA SP.	5509090299	N	23	575

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110220	4	4	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	504	12600
110220	4	4	09/11/91	10	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	14	350
110220	4	4	09/11/91	10	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110220	4	4	09/11/91	10	12918	SG	CERASTO DERMAPINNULATUM	5515220601	N	1	25
110220	4	4	09/11/91	10	12918	SG	CIRRA TULIDAE	5001500000	N	235	5875
110220	4	4	09/11/91	10	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110220	4	4	09/11/91	10	12918	SG	COSSURA SOYERI	5001520196	N	1	25
110220	4	4	09/11/91	10	12918	SG	DYNAMENA PUMILA	3704050697	C		
110220	4	4	09/11/91	10	12918	SG	EDOTEA TRILOBA	6162020798	N	2	50
110220	4	4	09/11/91	10	12918	SG	ETEONE LONGA	5001130205	N	1	25
110220	4	4	09/11/91	10	12918	SG	ETEONE SP.	5001130299	N	3	75
110220	4	4	09/11/91	10	12918	SG	EUDENDRIUM SP.	3703080199	C		
110220	4	4	09/11/91	10	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110220	4	4	09/11/91	10	12918	SG	FLABELLIGERIDAE	5001540000	N	1	25
110220	4	4	09/11/91	10	12918	SG	GASTROPODA	51	N	4	100
110220	4	4	09/11/91	10	12918	SG	HALICLONA OCULATA	3663020298	C		
110220	4	4	09/11/91	10	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110220	4	4	09/11/91	10	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110220	4	4	09/11/91	10	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	5	125
110220	4	4	09/11/91	10	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110220	4	4	09/11/91	10	12918	SG	LEUCON AMERICANUS	6154040110	N	2	50
110220	4	4	09/11/91	10	12918	SG	LYONSIA HYALINA	5520050206	N	9	225
110220	4	4	09/11/91	10	12918	SG	LYONSIA SP.	5520050299	N	1	25
110220	4	4	09/11/91	10	12918	SG	MEDIOMASTUS SP.	5001600499	N	21	525
110220	4	4	09/11/91	10	12918	SG	MYA ARENARIA	5517010201	N	1	25
110220	4	4	09/11/91	10	12918	SG	MYTILIDAE	5507010000	N	38	950
110220	4	4	09/11/91	10	12918	SG	NEPHTYIDAE	5001250000	N	5	125
110220	4	4	09/11/91	10	12918	SG	NINOE NIGRIPES	5001310204	N	41	1025
110220	4	4	09/11/91	10	12918	SG	NUCULA SP.	5502020299	N	6	150
110220	4	4	09/11/91	10	12918	SG	OLIGOCHAETA	5004000000	N	157	3925
110220	4	4	09/11/91	10	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	5	125
110220	4	4	09/11/91	10	12918	SG	OWENIA FUSIFORMIS	5001640102	N	1	25
110220	4	4	09/11/91	10	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	6	150
110220	4	4	09/11/91	10	12918	SG	PHERUSA AFFINIS	5001540304	N	3	75
110220	4	4	09/11/91	10	12918	SG	PHOLOE MINUTA	5001060101	N	11	275
110220	4	4	09/11/91	10	12918	SG	PHOTISMA CROCOXA	6169260208	N	1	25
110220	4	4	09/11/91	10	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	5	125
110220	4	4	09/11/91	10	12918	SG	PRIONOSPIO SP.	5001430599	N	4	100
110220	4	4	09/11/91	10	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	7	175
110220	4	4	09/11/91	10	12918	SG	RHYNCHOCOELA	4300000000	N	15	375
110220	4	4	09/11/91	10	12918	SG	SCOLETOMA HEBES	5001319898	N	29	725
110220	4	4	09/11/91	10	12918	SG	SCOLETOMA SP.	5001319899	N	7	175
110220	4	4	09/11/91	10	12918	SG	SERTULARIA CUPRESSINA	3704050316	C		
110220	4	4	09/11/91	10	12918	SG	SOLEMYA SP.	5504010199	N	4	100
110220	4	4	09/11/91	10	12918	SG	SPIO SETOSA	5001430704	N	3	75
110220	4	4	09/11/91	10	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	11	275
110220	4	4	09/11/91	10	12918	SG	TELLINA AGILIS	5515310205	N	3	75
110220	4	4	09/11/91	10	12918	SG	TRICELLARIA PEACHII	7815280398	C		
110220	4	4	09/11/91	10	12918	SG	TURBELLARIA	3901000000	N	2	50
110220	4	4	09/11/91	10	12918	SG	UNCIOLA IRRORATA	6169150703	N	1	25
110220	4	4	09/11/91	10	12918	SG	UNCIOLA SP.	6169150799	N	2	50
110222	1	1	09/11/91	4	12918	SG	AMPELISCA ABDITA	6169020108	N	24	600
110222	1	1	09/11/91	4	12918	SG	AMPELISCA SP.	6169020199	N	27	675
110222	1	1	09/11/91	4	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	6	150
110222	1	1	09/11/91	4	12918	SG	CIRRATULIDAE	5001500000	N	598	14950
110222	1	1	09/11/91	4	12918	SG	ETEONELONGA	5001130205	N	3	75
110222	1	1	09/11/91	4	12918	SG	ETEONE SP.	5001130299	N	3	75
110222	1	1	09/11/91	4	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110222	1	1	09/11/91	4	12918	SG	MEDIOMASTUS SP.	5001600499	N	17	425
110222	1	1	09/11/91	4	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	10	250
110222	1	1	09/11/91	4	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110222	1	1	09/11/91	4	12918	SG	MYTILIDAE	5507010000	N	7	175
110222	1	1	09/11/91	4	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110222	1	1	09/11/91	4	12918	SG	NEPHTYIDAE	5001250000	N	37	925
110222	1	1	09/11/91	4	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110222	1	1	09/11/91	4	12918	SG	NINOE NIGRIPES	5001310204	N	17	425
110222	1	1	09/11/91	4	12918	SG	OLIGOCHAETA	5004000000	N	378	9450
110222	1	1	09/11/91	4	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110222	1	1	09/11/91	4	12918	SG	PRIONOSPIO SP.	5001430599	N	12	300
110222	1	1	09/11/91	4	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	14	350
110222	1	1	09/11/91	4	12918	SG	PYGOSPIO ELEGANS	5001431302	N	43	1075
110222	1	1	09/11/91	4	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110222	1	1	09/11/91	4	12918	SG	SCOLETOMA HEBES	5001319898	N	2	50
110222	1	1	09/11/91	4	12918	SG	SPIONIDAE	500143	N	1	25
110222	1	1	09/11/91	4	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1903	47575
110222	1	1	09/11/91	4	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110222	2	2	09/11/91	4	12918	SG	AMPELISCA ABDITA	6169020108	N	11	275
110222	2	2	09/11/91	4	12918	SG	AMPELISCA SP.	6169020199	N	16	400
110222	2	2	09/11/91	4	12918	SG	CIRRA TULIDAE	5001500000	N	268	6700
110222	2	2	09/11/91	4	12918	SG	ETEONE LONGA	5001130205	N	1	25
110222	2	2	09/11/91	4	12918	SG	ETEONE SP.	5001130299	N	1	25
110222	2	2	09/11/91	4	12918	SG	LEUCON AMERICANUS	6154040110	N	1	25
110222	2	2	09/11/91	4	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	2	50
110222	2	2	09/11/91	4	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110222	2	2	09/11/91	4	12918	SG	MYTILIDAE	5507010000	N	2	50
110222	2	2	09/11/91	4	12918	SG	NEPHTYIDAE	5001250000	N	50	1250
110222	2	2	09/11/91	4	12918	SG	NINOE NIGRIPES	5001310204	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110222	2	2	09/11/91	4	12918	SG	OLIGOCHAETA	5004000000	N	209	5225
110222	2	2	09/11/91	4	12918	SG	OPHELINA ACUMINATA	5001580698	N	1	25
110222	2	2	09/11/91	4	12918	SG	POLYDORA CORNUTA	5001430498	N	3	75
110222	2	2	09/11/91	4	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110222	2	2	09/11/91	4	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	7	175
110222	2	2	09/11/91	4	12918	SG	PYGOSPIO ELEGANS	5001431302	N	14	350
110222	2	2	09/11/91	4	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110222	2	2	09/11/91	4	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	520	13000
110222	2	2	09/11/91	4	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110222	3	3	09/11/91	4	12918	SG	AMPELISCA ABDITA	6169020108	N	84	2100
110222	3	3	09/11/91	4	12918	SG	AMPELISCA SP.	6169020199	N	181	4525
110222	3	3	09/11/91	4	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	10	250
110222	3	3	09/11/91	4	12918	SG	BIVALVIA	55	N	1	25
110222	3	3	09/11/91	4	12918	SG	CERASTODERM APINNULATUM	5515220601	N	1	25
110222	3	3	09/11/91	4	12918	SG	CIRRA TULIDAE	5001500000	N	1764	44100
110222	3	3	09/11/91	4	12918	SG	ETEONE LONGA	5001130205	N	2	50
110222	3	3	09/11/91	4	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110222	3	3	09/11/91	4	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110222	3	3	09/11/91	4	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	3	75
110222	3	3	09/11/91	4	12918	SG	LEUCON AMERICANUS	6154040110	N	3	75
110222	3	3	09/11/91	4	12918	SG	LYONSIA SP.	5520050299	N	1	25
110222	3	3	09/11/91	4	12918	SG	MEDIOMASTUS SP.	5001600499	N	16	400
110222	3	3	09/11/91	4	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	123	3075
110222	3	3	09/11/91	4	12918	SG	MINUSPIO SP.	5001432699	N	2	50
110222	3	3	09/11/91	4	12918	SG	MYTILIDAE	5507010000	N	15	375
110222	3	3	09/11/91	4	12918	SG	NEPHTYIDAE	5001250000	N	55	1375
110222	3	3	09/11/91	4	12918	SG	NINOE NIGRIPES	5001310204	N	7	175
110222	3	3	09/11/91	4	12918	SG	OLIGOCHAETA	5004000000	N	993	24825
110222	3	3	09/11/91	4	12918	SG	OPHELINA ACUMINATA	5001580698	N	2	50
110222	3	3	09/11/91	4	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	2	50
110222	3	3	09/11/91	4	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110222	3	3	09/11/91	4	12918	SG	PHORONIS SP.	7700010299	N	1	25
110222	3	3	09/11/91	4	12918	SG	PHOTISMA CROCOXA	6169260208	N	4	100
110222	3	3	09/11/91	4	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110222	3	3	09/11/91	4	12918	SG	PRIONOSPIO SP.	5001430599	N	17	425
110222	3	3	09/11/91	4	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	23	575
110222	3	3	09/11/91	4	12918	SG	PYGOSPIO ELEGANS	5001431302	N	86	2150
110222	3	3	09/11/91	4	12918	SG	RHYNCHOCOELA	4300000000	N	4	100
110222	3	3	09/11/91	4	12918	SG	SCOLETOMA HEBES	5001319898	N	1	25
110222	3	3	09/11/91	4	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110222	3	3	09/11/91	4	12918	SG	SPIONIDAE	500143	N	1	25
110222	3	3	09/11/91	4	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	4877	121925
110222	3	3	09/11/91	4	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110222	3	3	09/11/91	4	12918	SG	TURBELLARIA	3901000000	N	1	25
110222	4	4	09/11/91	4	12918	SG	AMPELISCA ABDITA	6169020108	N	16	400
110222	4	4	09/11/91	4	12918	SG	AMPELISCA SP.	6169020199	N	15	375
110222	4	4	09/11/91	4	12918	SG	NAITIDES MUCOSA	5001130104	N	1	25
110222	4	4	09/11/91	4	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	2	50
110222	4	4	09/11/91	4	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110222	4	4	09/11/91	4	12918	SG	CIRRATULIDAE	5001500000	N	428	10700
110222	4	4	09/11/91	4	12918	SG	EDOTEATRILOBA	6162020798	N	1	25
110222	4	4	09/11/91	4	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110222	4	4	09/11/91	4	12918	SG	MEDIOMASTUS SP.	5001600499	N	4	100
110222	4	4	09/11/91	4	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110222	4	4	09/11/91	4	12918	SG	MYTILIDAE	5507010000	N	3	75
110222	4	4	09/11/91	4	12918	SG	NEPHTYIDAE	5001250000	N	40	1000
110222	4	4	09/11/91	4	12918	SG	NINOE NIGRIPES	5001310204	N	4	100
110222	4	4	09/11/91	4	12918	SG	OLIGOCHAETA	5004000000	N	322	8050
110222	4	4	09/11/91	4	12918	SG	OPHELINA ACUMINATA	5001580698	N	1	25
110222	4	4	09/11/91	4	12918	SG	PRIONOSPIO SP.	5001430599	N	10	250
110222	4	4	09/11/91	4	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	12	300
110222	4	4	09/11/91	4	12918	SG	PYGOSPIO ELEGANS	5001431302	N	7	175
110222	4	4	09/11/91	4	12918	SG	RHYNCHOCOELA	4300000000	N	4	100
110222	4	4	09/11/91	4	12918	SG	SPIONIDAE	500143	N	1	25
110222	4	4	09/11/91	4	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1376	34400
110223	1	1	09/11/91	20	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	2	50
110223	1	1	09/11/91	20	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110223	1	1	09/11/91	20	12918	SG	AMPELISCA SP.	6169020199	N	6	150
110223	1	1	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	3	75
110223	1	1	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	4	100
110223	1	1	09/11/91	20	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110223	1	1	09/11/91	20	12918	SG	CIRRATULIDAE	5001500000	N	5	125
110223	1	1	09/11/91	20	12918	SG	CIRRATULUS GRANDIS	5001500104	N	1	25
110223	1	1	09/11/91	20	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110223	1	1	09/11/91	20	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	2	50
110223	1	1	09/11/91	20	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	4	100
110223	1	1	09/11/91	20	12918	SG	MEDIOMASTUS SP.	5001600499	N	8	200
110223	1	1	09/11/91	20	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110223	1	1	09/11/91	20	12918	SG	MYTILIDAE	5507010000	N	1	25
110223	1	1	09/11/91	20	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110223	1	1	09/11/91	20	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110223	1	1	09/11/91	20	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110223	1	1	09/11/91	20	12918	SG	OLIGOCHAETA	5004000000	N	183	4575
110223	1	1	09/11/91	20	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	4	100
110223	1	1	09/11/91	20	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110223	1	1	09/11/91	20	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110223	1	1	09/11/91	20	12918	SG	RHYNCHOCOELA	4300000000	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110223	1	1	09/11/91	20	12918	SG	SCOLETOMA HEBES	5001319898	N	31	775
110223	1	1	09/11/91	20	12918	SG	SCOLETOMA SP.	5001319899	N	59	1475
110223	1	1	09/11/91	20	12918	SG	SPIOSETOSA	5001430704	N	1	25
110223	1	1	09/11/91	20	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	12	300
110223	2	2	09/11/91	20	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	2	50
110223	2	2	09/11/91	20	12918	SG	AMPELISCA ABDITA	6169020108	N	5	125
110223	2	2	09/11/91	20	12918	SG	AMPELISCA SP.	6169020199	N	14	350
110223	2	2	09/11/91	20	12918	SG	NAITIDES MUCOSA	5001130104	N	1	25
110223	2	2	09/11/91	20	12918	SG	ANOMIA SP.	5509090299	N	1	25
110223	2	2	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	5	125
110223	2	2	09/11/91	20	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110223	2	2	09/11/91	20	12918	SG	CIRRATULIDAE	5001500000	N	13	325
110223	2	2	09/11/91	20	12918	SG	ETEONE SP.	5001130299	N	1	25
110223	2	2	09/11/91	20	12918	SG	EXOGONE HEBES	5001230707	N	7	175
110223	2	2	09/11/91	20	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	1	25
110223	2	2	09/11/91	20	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110223	2	2	09/11/91	20	12918	SG	LITTORINA LITTOREA	5103100108	N	1	25
110223	2	2	09/11/91	20	12918	SG	MEDIOMASTUS SP.	5001600499	N	9	225
110223	2	2	09/11/91	20	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110223	2	2	09/11/91	20	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110223	2	2	09/11/91	20	12918	SG	NEPHTYS CILIATA	5001250102	N	4	100
110223	2	2	09/11/91	20	12918	SG	NEREIDAE	500124	N	1	25
110223	2	2	09/11/91	20	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110223	2	2	09/11/91	20	12918	SG	OLIGOCHAETA	5004000000	N	396	9900
110223	2	2	09/11/91	20	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110223	2	2	09/11/91	20	12918	SG	PHOXOCEPHALUHOLBOLLI	6169420702	N	2	50
110223	2	2	09/11/91	20	12918	SG	POLYDORA CORNUTA	5001430498	N	3	75
110223	2	2	09/11/91	20	12918	SG	PYGOSPIO ELEGANS	5001431302	N	15	375
110223	2	2	09/11/91	20	12918	SG	SCOLETOMA HEBES	5001319898	N	31	775
110223	2	2	09/11/91	20	12918	SG	SCOLETOMA SP.	5001319899	N	61	1525
110223	2	2	09/11/91	20	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	74	1850
110223	3	3	09/11/91	20	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110223	3	3	09/11/91	20	12918	SG	AMPELISCA SP.	6169020199	N	33	825
110223	3	3	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	19	475
110223	3	3	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	7	175
110223	3	3	09/11/91	20	12918	SG	CIRRATULIDAE	5001500000	N	29	725
110223	3	3	09/11/91	20	12918	SG	EXOGONE HEBES	5001230707	N	7	175
110223	3	3	09/11/91	20	12918	SG	FABRICIA SABELLA	5001701301	N	1	25
110223	3	3	09/11/91	20	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110223	3	3	09/11/91	20	12918	SG	LITTORINA LITTOREA	5103100108	N	2	50
110223	3	3	09/11/91	20	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110223	3	3	09/11/91	20	12918	SG	MEDIOMASTUS SP.	5001600499	N	7	175
110223	3	3	09/11/91	20	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110223	3	3	09/11/91	20	12918	SG	OLIGOCHAETA	5004000000	N	269	6725
110223	3	3	09/11/91	20	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	2	50
110223	3	3	09/11/91	20	12918	SG	POLYDORA CORNUTA	5001430498	N	4	100
110223	3	3	09/11/91	20	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	2	50
110223	3	3	09/11/91	20	12918	SG	POLYDORA SOCIALIS	5001430402	N	1	25
110223	3	3	09/11/91	20	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110223	3	3	09/11/91	20	12918	SG	PYGOSPIO ELEGANS	5001431302	N	15	375
110223	3	3	09/11/91	20	12918	SG	SCOLETOMA HEBES	5001319898	N	60	1500
110223	3	3	09/11/91	20	12918	SG	SCOLETOMA SP.	5001319899	N	125	3125
110223	3	3	09/11/91	20	12918	SG	SPIOSETOSA	5001430704	N	3	75
110223	3	3	09/11/91	20	12918	SG	SPIONIDAE	500143	N	1	25
110223	3	3	09/11/91	20	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	127	3175
110223	3	3	09/11/91	20	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110223	4	4	09/11/91	20	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	4	100
110223	4	4	09/11/91	20	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110223	4	4	09/11/91	20	12918	SG	AMPELISCA SP.	6169020199	N	20	500
110223	4	4	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	7	175
110223	4	4	09/11/91	20	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110223	4	4	09/11/91	20	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110223	4	4	09/11/91	20	12918	SG	CIRRATULIDAE	5001500000	N	27	675
110223	4	4	09/11/91	20	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110223	4	4	09/11/91	20	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110223	4	4	09/11/91	20	12918	SG	EXOGONE HEBES	5001230707	N	11	275
110223	4	4	09/11/91	20	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110223	4	4	09/11/91	20	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	2	50
110223	4	4	09/11/91	20	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110223	4	4	09/11/91	20	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110223	4	4	09/11/91	20	12918	SG	MALDANIDAE	500163	N	1	25
110223	4	4	09/11/91	20	12918	SG	MEDIOMASTUS SP.	5001600499	N	13	325
110223	4	4	09/11/91	20	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110223	4	4	09/11/91	20	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110223	4	4	09/11/91	20	12918	SG	NEPHTYSCAECA	5001250103	N	1	25
110223	4	4	09/11/91	20	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110223	4	4	09/11/91	20	12918	SG	OLIGOCHAETA	5004000000	N	553	13825
110223	4	4	09/11/91	20	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110223	4	4	09/11/91	20	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	9	225
110223	4	4	09/11/91	20	12918	SG	POLYDORA CORNUTA	5001430498	N	4	100
110223	4	4	09/11/91	20	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	1	25
110223	4	4	09/11/91	20	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110223	4	4	09/11/91	20	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	2	50
110223	4	4	09/11/91	20	12918	SG	PYGOSPIO ELEGANS	5001431302	N	17	425
110223	4	4	09/11/91	20	12918	SG	SCOLETOMA HEBES	5001319898	N	55	1375
110223	4	4	09/11/91	20	12918	SG	SCOLETOMA SP.	5001319899	N	53	1325
110223	4	4	09/11/91	20	12918	SG	SPIONIDAE	500143	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110223	4	4	09/11/91	20	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	81	2025
110223	4	4	09/11/91	20	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110224	1	1	09/12/91	6	12918	SG	AMPELISCA ABDITA	6169020108	N	33	825
110224	1	1	09/12/91	6	12918	SG	AMPELISCA SP.	6169020199	N	8	200
110224	1	1	09/12/91	6	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	8	200
110224	1	1	09/12/91	6	12918	SG	CIRRATULIDAE	5001500000	N	164	4100
110224	1	1	09/12/91	6	12918	SG	CUMACEA	6154	N	1	25
110224	1	1	09/12/91	6	12918	SG	ETEONE LONGA	5001130205	N	2	50
110224	1	1	09/12/91	6	12918	SG	ETEONE SP.	5001130299	N	1	25
110224	1	1	09/12/91	6	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	4	100
110224	1	1	09/12/91	6	12918	SG	MEDIOMASTUS SP.	5001600499	N	12	300
110224	1	1	09/12/91	6	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	7	175
110224	1	1	09/12/91	6	12918	SG	MYTILIDAE	5507010000	N	6	150
110224	1	1	09/12/91	6	12918	SG	NEPHTYIDAE	5001250000	N	46	1150
110224	1	1	09/12/91	6	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110224	1	1	09/12/91	6	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110224	1	1	09/12/91	6	12918	SG	OLIGOCHAETA	5004000000	N	721	18025
110224	1	1	09/12/91	6	12918	SG	OPHELINA ACUMINATA	5001580698	N	2	50
110224	1	1	09/12/91	6	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110224	1	1	09/12/91	6	12918	SG	PRIONOSPIO SP.	5001430599	N	29	725
110224	1	1	09/12/91	6	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	23	575
110224	1	1	09/12/91	6	12918	SG	PYGOSPIO ELEGANS	5001431302	N	21	525
110224	1	1	09/12/91	6	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110224	1	1	09/12/91	6	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1472	36800
110224	1	1	09/12/91	6	12918	SG	TELLINA AGILIS	5515310205	N	5	125
110224	2	2	09/12/91	6	12918	SG	AMPELISCA ABDITA	6169020108	N	16	400
110224	2	2	09/12/91	6	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110224	2	2	09/12/91	6	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	7	175
110224	2	2	09/12/91	6	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110224	2	2	09/12/91	6	12918	SG	CIRRATULIDAE	5001500000	N	103	2575
110224	2	2	09/12/91	6	12918	SG	ETEONE LONGA	5001130205	N	1	25
110224	2	2	09/12/91	6	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	1	25
110224	2	2	09/12/91	6	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110224	2	2	09/12/91	6	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110224	2	2	09/12/91	6	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110224	2	2	09/12/91	6	12918	SG	MYA ARENARIA	5517010201	N	4	100
110224	2	2	09/12/91	6	12918	SG	MYTILIDAE	5507010000	N	1	25
110224	2	2	09/12/91	6	12918	SG	NEPHTYIDAE	5001250000	N	20	500
110224	2	2	09/12/91	6	12918	SG	OLIGOCHAETA	5004000000	N	239	5975
110224	2	2	09/12/91	6	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110224	2	2	09/12/91	6	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	8	200
110224	2	2	09/12/91	6	12918	SG	PYGOSPIO ELEGANS	5001431302	N	6	150
110224	2	2	09/12/91	6	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110224	2	2	09/12/91	6	12918	SG	SPIONIDAE	500143	N	1	25
110224	2	2	09/12/91	6	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	854	21350
110224	2	2	09/12/91	6	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110224	2	2	09/12/91	6	12918	SG	TURBELLARIA	3901000000	N	1	25
110224	3	3	09/12/91	6	12918	SG	AMPELISCA ABDITA	6169020108	N	13	325
110224	3	3	09/12/91	6	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110224	3	3	09/12/91	6	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	3	75
110224	3	3	09/12/91	6	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110224	3	3	09/12/91	6	12918	SG	CIRRATULIDAE	5001500000	N	140	3500
110224	3	3	09/12/91	6	12918	SG	CRENELLA SP.	5507010299	N	1	25
110224	3	3	09/12/91	6	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	4	100
110224	3	3	09/12/91	6	12918	SG	MYTILIDAE	5507010000	N	2	50
110224	3	3	09/12/91	6	12918	SG	NEPHTYIDAE	5001250000	N	19	475
110224	3	3	09/12/91	6	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110224	3	3	09/12/91	6	12918	SG	OLIGOCHAETA	5004000000	N	430	10750
110224	3	3	09/12/91	6	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110224	3	3	09/12/91	6	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110224	3	3	09/12/91	6	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110224	3	3	09/12/91	6	12918	SG	PYGOSPIO ELEGANS	5001431302	N	13	325
110224	3	3	09/12/91	6	12918	SG	SPIONIDAE	500143	N	1	25
110224	3	3	09/12/91	6	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	774	19350
110224	3	3	09/12/91	6	12918	SG	TELLINA AGILIS	5515310205	N	2	50
110224	4	4	09/12/91	6	12918	SG	AMPELISCA ABDITA	6169020108	N	16	400
110224	4	4	09/12/91	6	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110224	4	4	09/12/91	6	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110224	4	4	09/12/91	6	12918	SG	CIRRATULIDAE	5001500000	N	73	1825
110224	4	4	09/12/91	6	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110224	4	4	09/12/91	6	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	4	100
110224	4	4	09/12/91	6	12918	SG	MYTILIDAE	5507010000	N	1	25
110224	4	4	09/12/91	6	12918	SG	NEPHTYIDAE	5001250000	N	2	50
110224	4	4	09/12/91	6	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110224	4	4	09/12/91	6	12918	SG	OLIGOCHAETA	5004000000	N	129	3225
110224	4	4	09/12/91	6	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110224	4	4	09/12/91	6	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	3	75
110224	4	4	09/12/91	6	12918	SG	PYGOSPIO ELEGANS	5001431302	N	8	200
110224	4	4	09/12/91	6	12918	SG	SPIONIDAE	500143	N	1	25
110224	4	4	09/12/91	6	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	309	7725
110224	4	4	09/12/91	6	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110225	1	1	09/12/91	8	12918	SG	AMPELISCA ABDITA	6169020108	N	16	400
110225	1	1	09/12/91	8	12918	SG	AMPELISCA SP.	6169020199	N	6	150
110225	1	1	09/12/91	8	12918	SG	ANAITIDES SP.	5001130199	N	2	50
110225	1	1	09/12/91	8	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	3	75
110225	1	1	09/12/91	8	12918	SG	BIVALVIA	55	N	1	25
110225	1	1	09/12/91	8	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110225	1	1	09/12/91	8	12918	SG	CIRRATULIDAE	5001500000	N	83	2075
110225	1	1	09/12/91	8	12918	SG	ETEONE LONGA	5001130205	N	3	75
110225	1	1	09/12/91	8	12918	SG	ETEONE SP.	5001130299	N	1	25
110225	1	1	09/12/91	8	12918	SG	GASTROPODA	51	N	2	50
110225	1	1	09/12/91	8	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110225	1	1	09/12/91	8	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110225	1	1	09/12/91	8	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110225	1	1	09/12/91	8	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	5	125
110225	1	1	09/12/91	8	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110225	1	1	09/12/91	8	12918	SG	MYTILIDAE	5507010000	N	8	200
110225	1	1	09/12/91	8	12918	SG	NEPHTYIDAE	5001250000	N	21	525
110225	1	1	09/12/91	8	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110225	1	1	09/12/91	8	12918	SG	OLIGOCHAETA	5004000000	N	337	8425
110225	1	1	09/12/91	8	12918	SG	OPHELINA ACUMINATA	5001580698	N	1	25
110225	1	1	09/12/91	8	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	2	50
110225	1	1	09/12/91	8	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110225	1	1	09/12/91	8	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110225	1	1	09/12/91	8	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110225	1	1	09/12/91	8	12918	SG	PRIONOSPIO SP.	5001430599	N	7	175
110225	1	1	09/12/91	8	12918	SG	PYGOSPIO ELEGANS	5001431302	N	28	700
110225	1	1	09/12/91	8	12918	SG	RHYNCHOCOELA	4300000000	N	4	100
110225	1	1	09/12/91	8	12918	SG	SPIONIDAE	500143	N	1	25
110225	1	1	09/12/91	8	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3944	98600
110225	1	1	09/12/91	8	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110225	2	2	09/12/91	8	12918	SG	AMPELISCA ABDITA	6169020108	N	11	275
110225	2	2	09/12/91	8	12918	SG	AMPELISCA SP.	6169020199	N	3	75
110225	2	2	09/12/91	8	12918	SG	ANAITIDES SP.	5001130199	N	2	50
110225	2	2	09/12/91	8	12918	SG	CAPITELLA CAPITATA	5001600101	N	6	150
110225	2	2	09/12/91	8	12918	SG	CIRRATULIDAE	5001500000	N	40	1000
110225	2	2	09/12/91	8	12918	SG	FABRICIA SABELLA	5001701301	N	1	25
110225	2	2	09/12/91	8	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	1	25
110225	2	2	09/12/91	8	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	3	75
110225	2	2	09/12/91	8	12918	SG	LEUCON AMERICANUS	6154040110	N	1	25
110225	2	2	09/12/91	8	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110225	2	2	09/12/91	8	12918	SG	MYTILIDAE	5507010000	N	11	275
110225	2	2	09/12/91	8	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110225	2	2	09/12/91	8	12918	SG	NEPHTYIDAE	5001250000	N	35	875
110225	2	2	09/12/91	8	12918	SG	OLIGOCHAETA	5004000000	N	588	14700
110225	2	2	09/12/91	8	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	4	100
110225	2	2	09/12/91	8	12918	SG	RHYNCHOCOELA	4300000000	N	4	100
110225	2	2	09/12/91	8	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3059	76475
110225	2	2	09/12/91	8	12918	SG	TELLINA AGILIS	5515310205	N	5	125
110225	2	2	09/12/91	8	12918	SG	TURBELLARIA	3901000000	N	2	50
110225	3	3	09/12/91	8	12918	SG	AMPELISCA ABDITA	6169020108	N	15	375
110225	3	3	09/12/91	8	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110225	3	3	09/12/91	8	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	7	175
110225	3	3	09/12/91	8	12918	SG	CAPITELLA CAPITATA	5001600101	N	6	150
110225	3	3	09/12/91	8	12918	SG	CIRRATULIDAE	5001500000	N	192	4800
110225	3	3	09/12/91	8	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110225	3	3	09/12/91	8	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110225	3	3	09/12/91	8	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110225	3	3	09/12/91	8	12918	SG	LEUCON AMERICANUS	6154040110	N	1	25
110225	3	3	09/12/91	8	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110225	3	3	09/12/91	8	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	14	350
110225	3	3	09/12/91	8	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110225	3	3	09/12/91	8	12918	SG	MYTILIDAE	5507010000	N	6	150
110225	3	3	09/12/91	8	12918	SG	NEPHTYIDAE	5001250000	N	13	325
110225	3	3	09/12/91	8	12918	SG	OLIGOCHAETA	5004000000	N	183	4575
110225	3	3	09/12/91	8	12918	SG	OPHELINA ACUMINATA	5001580698	N	1	25
110225	3	3	09/12/91	8	12918	SG	PRIONOSPIO SP.	5001430599	N	7	175
110225	3	3	09/12/91	8	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110225	3	3	09/12/91	8	12918	SG	RHYNCHOCOELA	4300000000	N	6	150
110225	3	3	09/12/91	8	12918	SG	SPIONIDAE	500143	N	1	25
110225	3	3	09/12/91	8	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3241	81025
110225	3	3	09/12/91	8	12918	SG	TELLINA AGILIS	5515310205	N	5	125
110225	4	4	09/12/91	8	12918	SG	AMPELISCA ABDITA	6169020108	N	48	1200
110225	4	4	09/12/91	8	12918	SG	AMPELISCA SP.	6169020199	N	38	950
110225	4	4	09/12/91	8	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	9	225
110225	4	4	09/12/91	8	12918	SG	ASABELLIDES OCULATA	5001670802	N	1	25
110225	4	4	09/12/91	8	12918	SG	BIVALVIA	55	N	1	25
110225	4	4	09/12/91	8	12918	SG	CAPITELLA CAPITATA	5001600101	N	7	175
110225	4	4	09/12/91	8	12918	SG	CIRRATULIDAE	5001500000	N	60	1500
110225	4	4	09/12/91	8	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110225	4	4	09/12/91	8	12918	SG	EDWARDSIA SP.	3759010199	N	1	25
110225	4	4	09/12/91	8	12918	SG	ETEONE LONGA	5001130205	N	3	75
110225	4	4	09/12/91	8	12918	SG	FABRICIA SABELLA	5001701301	N	2	50
110225	4	4	09/12/91	8	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	3	75
110225	4	4	09/12/91	8	12918	SG	LEITOSCOLOPLOSROBUSTUS	5001409898	N	6	150
110225	4	4	09/12/91	8	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110225	4	4	09/12/91	8	12918	SG	LEUCON AMERICANUS	6154040110	N	2	50
110225	4	4	09/12/91	8	12918	SG	MACOMA SP.	5515310199	N	3	75
110225	4	4	09/12/91	8	12918	SG	MEDIOMASTUS SP.	5001600499	N	15	375
110225	4	4	09/12/91	8	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	5	125
110225	4	4	09/12/91	8	12918	SG	MYTILIDAE	5507010000	N	23	575
110225	4	4	09/12/91	8	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110225	4	4	09/12/91	8	12918	SG	NEPHTYIDAE	5001250000	N	60	1500
110225	4	4	09/12/91	8	12918	SG	NEPHTYS CILIATA	5001250102	N	3	75

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110225	4	4	09/12/91	8	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110225	4	4	09/12/91	8	12918	SG	OLIGOCHAETA	5004000000	N	1034	25850
110225	4	4	09/12/91	8	12918	SG	OPHELINA ACUMINATA	5001580698	N	2	50
110225	4	4	09/12/91	8	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	5	125
110225	4	4	09/12/91	8	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110225	4	4	09/12/91	8	12918	SG	PHOTISMA CROCOXA	6169260208	N	1	25
110225	4	4	09/12/91	8	12918	SG	POLYDORA CORNUTA	5001430498	N	4	100
110225	4	4	09/12/91	8	12918	SG	PRIONOSPIO SP.	5001430599	N	22	550
110225	4	4	09/12/91	8	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	12	300
110225	4	4	09/12/91	8	12918	SG	PYGOSPIOELEGANS	5001431302	N	37	925
110225	4	4	09/12/91	8	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110225	4	4	09/12/91	8	12918	SG	SOLEMYA SP.	5504010199	N	1	25
110225	4	4	09/12/91	8	12918	SG	SOLENIDAE	551529	I	25	
110225	4	4	09/12/91	8	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3749	93725
110225	4	4	09/12/91	8	12918	SG	TELLINA AGILIS	5515310205	N	12	300
110226	1	1	09/12/91	7	12918	SG	AMPELISCA ABDITA	6169020108	N	28	700
110226	1	1	09/12/91	7	12918	SG	AMPELISCA SP.	6169020199	N	13	325
110226	1	1	09/12/91	7	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110226	1	1	09/12/91	7	12918	SG	CARCINUS MAENAS	6189010701	N	1	25
110226	1	1	09/12/91	7	12918	SG	CIRRATULIDAE	5001500000	N	28	700
110226	1	1	09/12/91	7	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110226	1	1	09/12/91	7	12918	SG	NEPHTYIDAE	5001250000	N	56	1400
110226	1	1	09/12/91	7	12918	SG	NEPHTYS INCISA	5001250115	N	2	50
110226	1	1	09/12/91	7	12918	SG	NINOENI GRIPES	5001310204	N	2	50
110226	1	1	09/12/91	7	12918	SG	OLIGOCHAETA	5004000000	N	48	1200
110226	1	1	09/12/91	7	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110226	1	1	09/12/91	7	12918	SG	PRIONOSPIO SP.	5001430599	N	4	100
110226	1	1	09/12/91	7	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	5	125
110226	1	1	09/12/91	7	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110226	1	1	09/12/91	7	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	33	825
110226	2	2	09/12/91	7	12918	SG	AMPELISCA ABDITA	6169020108	N	26	650
110226	2	2	09/12/91	7	12918	SG	AMPELISCA SP.	6169020199	N	24	600
110226	2	2	09/12/91	7	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110226	2	2	09/12/91	7	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110226	2	2	09/12/91	7	12918	SG	CIRRATULIDAE	5001500000	N	57	1425
110226	2	2	09/12/91	7	12918	SG	HALICHONDRIA PANICEA	3665020202	C		
110226	2	2	09/12/91	7	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	2	50
110226	2	2	09/12/91	7	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	15	375
110226	2	2	09/12/91	7	12918	SG	MYTILIDAE	5507010000	N	13	325
110226	2	2	09/12/91	7	12918	SG	NEPHTYIDAE	5001250000	N	122	3050
110226	2	2	09/12/91	7	12918	SG	OLIGOCHAETA	5004000000	N	548	13700
110226	2	2	09/12/91	7	12918	SG	PHORONIS SP.	7700010299	N	1	25
110226	2	2	09/12/91	7	12918	SG	PRIONOSPIO SP.	5001430599	N	10	250
110226	2	2	09/12/91	7	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	20	500
110226	2	2	09/12/91	7	12918	SG	PYGOSPIO ELEGANS	5001431302	N	3	75
110226	2	2	09/12/91	7	12918	SG	RHYNCHOCOELA	4300000000	N	4	100
110226	2	2	09/12/91	7	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	80	2000
110226	2	2	09/12/91	7	12918	SG	TURBELLARIA	3901000000	N	1	25
110226	3	3	09/12/91	7	12918	SG	AMPELISCA ABDITA	6169020108	N	16	400
110226	3	3	09/12/91	7	12918	SG	AMPELISCA SP.	6169020199	N	10	250
110226	3	3	09/12/91	7	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	2	50
110226	3	3	09/12/91	7	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110226	3	3	09/12/91	7	12918	SG	CIRRATULIDAE	5001500000	N	46	1150
110226	3	3	09/12/91	7	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110226	3	3	09/12/91	7	12918	SG	MYTILIDAE	5507010000	N	3	75
110226	3	3	09/12/91	7	12918	SG	NEPHTYIDAE	5001250000	N	41	1025
110226	3	3	09/12/91	7	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110226	3	3	09/12/91	7	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110226	3	3	09/12/91	7	12918	SG	OLIGOCHAETA	5004000000	N	100	2500
110226	3	3	09/12/91	7	12918	SG	PHORONIS SP.	7700010299	N	2	50
110226	3	3	09/12/91	7	12918	SG	PRIONOSPIO SP.	5001430599	N	6	150
110226	3	3	09/12/91	7	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	12	300
110226	3	3	09/12/91	7	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110226	3	3	09/12/91	7	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	46	1150
110226	4	4	09/12/91	7	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110226	4	4	09/12/91	7	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110226	4	4	09/12/91	7	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110226	4	4	09/12/91	7	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110226	4	4	09/12/91	7	12918	SG	CIRRATULIDAE	5001500000	N	15	375
110226	4	4	09/12/91	7	12918	SG	MYTILIDAE	5507010000	N	1	25
110226	4	4	09/12/91	7	12918	SG	NEPHTYIDAE	5001250000	N	51	1275
110226	4	4	09/12/91	7	12918	SG	OLIGOCHAETA	5004000000	N	123	3075
110226	4	4	09/12/91	7	12918	SG	PRIONOSPIO SP.	5001430599	N	5	125
110226	4	4	09/12/91	7	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	11	275
110226	4	4	09/12/91	7	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110226	4	4	09/12/91	7	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	27	675
110227	1	1	09/13/91	23	12918	SG	ACMAEATES TUDINALIS	5102050108	N	1	25
110227	1	1	09/13/91	23	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110227	1	1	09/13/91	23	12918	SG	AMPELISCA SP.	6169020199	N	10	250
110227	1	1	09/13/91	23	12918	SG	NAITIDES MACULATA	5001130106	N	4	100
110227	1	1	09/13/91	23	12918	SG	APLIDIUM SP.	8403020199	C		
110227	1	1	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	173	4325
110227	1	1	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	17	425
110227	1	1	09/13/91	23	12918	SG	BIVALVIA	55	N	1	25
110227	1	1	09/13/91	23	12918	SG	CAPITELLA CAPITATA	5001600101	N	17	425
110227	1	1	09/13/91	23	12918	SG	CAPRELLA PENANTIS	6171010727	N	1	25
110227	1	1	09/13/91	23	12918	SG	CIRRATULIDAE	5001500000	N	9	225

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110227	1	1	09/13/91	23	12918	SG	CLYMENELLA TORQUATA	5001630202	N	115	2875
110227	1	1	09/13/91	23	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	16	400
110227	1	1	09/13/91	23	12918	SG	COROPHIUM BONELLI	6169150202	N	16	400
110227	1	1	09/13/91	23	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	38	950
110227	1	1	09/13/91	23	12918	SG	COROPHIUM SP.	6169150299	N	25	625
110227	1	1	09/13/91	23	12918	SG	CREPIDULA SP.	5103640299	N	7	175
110227	1	1	09/13/91	23	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110227	1	1	09/13/91	23	12918	SG	ETEONE LONGA	5001130205	N	2	50
110227	1	1	09/13/91	23	12918	SG	EXOGONE HEBES	5001230707	N	36	900
110227	1	1	09/13/91	23	12918	SG	FABRICIA SABELLA	5001701301	N	1	25
110227	1	1	09/13/91	23	12918	SG	GASTROPODA	51	N	150	3750
110227	1	1	09/13/91	23	12918	SG	GLYCERADI BRANCHIATA	5001270105	N	1	25
110227	1	1	09/13/91	23	12918	SG	JAERA MARINA	6163060298	N	7	175
110227	1	1	09/13/91	23	12918	SG	LACUNA VINCTA	5103090305	N	8	200
110227	1	1	09/13/91	23	12918	SG	LITTORINA LITTOREA	5103100108	N	2	50
110227	1	1	09/13/91	23	12918	SG	LYONSIA HYALINA	5520050206	N	11	275
110227	1	1	09/13/91	23	12918	SG	LYONSIA SP.	5520050299	N	1	25
110227	1	1	09/13/91	23	12918	SG	MACOMA SP.	5515310199	N	1	25
110227	1	1	09/13/91	23	12918	SG	MALDANIDAE	500163	N	5	125
110227	1	1	09/13/91	23	12918	SG	METRIDIUM SENILE	3760060101	N	2	50
110227	1	1	09/13/91	23	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	5	125
110227	1	1	09/13/91	23	12918	SG	MICRODEUTOPUS SP.	6169060499	N	18	450
110227	1	1	09/13/91	23	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	3	75
110227	1	1	09/13/91	23	12918	SG	MINUSPIO SP.	5001432699	N	2	50
110227	1	1	09/13/91	23	12918	SG	MYA ARENARIA	5517010201	N	9	225
110227	1	1	09/13/91	23	12918	SG	MYTILIDAE	5507010000	N	313	7825
110227	1	1	09/13/91	23	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110227	1	1	09/13/91	23	12918	SG	NEREIDAE	500124	N	1	25
110227	1	1	09/13/91	23	12918	SG	OLIGOCHAETA	5004000000	N	263	6575
110227	1	1	09/13/91	23	12918	SG	PARACAPRELLA TENUIS	6171010901	N	1	25
110227	1	1	09/13/91	23	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110227	1	1	09/13/91	23	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	54	1350
110227	1	1	09/13/91	23	12918	SG	POLYDORA CORNUTA	5001430498	N	2	50
110227	1	1	09/13/91	23	12918	SG	PYGOSPIO ELEGANS	5001431302	N	100	2500
110227	1	1	09/13/91	23	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110227	1	1	09/13/91	23	12918	SG	SPIO SETOSA	5001430704	N	1	25
110227	1	1	09/13/91	23	12918	SG	SPIONIDAE	500143	N	1	25
110227	1	1	09/13/91	23	12918	SG	SPIOPHANES BOMBYX	5001431001	N	2	50
110227	1	1	09/13/91	23	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2	50
110227	1	1	09/13/91	23	12918	SG	TELLINA AGILIS	5515310205	N	3	75
110227	1	1	09/13/91	23	12918	SG	TURBELLARIA	3901000000	N	1	25
110227	1	1	09/13/91	23	12918	SG	UNCIOLA IRRORATA	6169150703	N	1	25
110227	2	2	09/13/91	23	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110227	2	2	09/13/91	23	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110227	2	2	09/13/91	23	12918	SG	NAITIDES MACULATA	5001130106	N	2	50
110227	2	2	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	119	2975
110227	2	2	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110227	2	2	09/13/91	23	12918	SG	CAPITELLA CAPITATA	5001600101	N	7	175
110227	2	2	09/13/91	23	12918	SG	CARCINUS MAENAS	6189010701	N	2	50
110227	2	2	09/13/91	23	12918	SG	CIRRATULIDAE	5001500000	N	15	375
110227	2	2	09/13/91	23	12918	SG	CLYMENELLA TORQUATA	5001630202	N	9	225
110227	2	2	09/13/91	23	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	2	50
110227	2	2	09/13/91	23	12918	SG	COROPHIUM BONELLI	6169150202	N	3	75
110227	2	2	09/13/91	23	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	36	900
110227	2	2	09/13/91	23	12918	SG	COROPHIUM SP.	6169150299	N	2	50
110227	2	2	09/13/91	23	12918	SG	CREPIDULA SP.	5103640299	N	4	100
110227	2	2	09/13/91	23	12918	SG	EXOGONE HEBES	5001230707	N	12	300
110227	2	2	09/13/91	23	12918	SG	GASTROPODA	51	N	32	800
110227	2	2	09/13/91	23	12918	SG	HARMOTHOE EXTENUATA	5001020803	N	1	25
110227	2	2	09/13/91	23	12918	SG	JAERA MARINA	6163060298	N	3	75
110227	2	2	09/13/91	23	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	1	25
110227	2	2	09/13/91	23	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110227	2	2	09/13/91	23	12918	SG	LITTORINA LITTOREA	5103100108	N	6	150
110227	2	2	09/13/91	23	12918	SG	LYONSIA HYALINA	5520050206	N	8	200
110227	2	2	09/13/91	23	12918	SG	MALDANIDAE	500163	N	1	25
110227	2	2	09/13/91	23	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110227	2	2	09/13/91	23	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	10	250
110227	2	2	09/13/91	23	12918	SG	MICRODEUTOPUS SP.	6169060499	N	6	150
110227	2	2	09/13/91	23	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	4	100
110227	2	2	09/13/91	23	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110227	2	2	09/13/91	23	12918	SG	MYA ARENARIA	5517010201	N	1	25
110227	2	2	09/13/91	23	12918	SG	MYTILIDAE	5507010000	N	120	3000
110227	2	2	9/13/91	23	12918	SG	OLIGOCHAETA	5004000000	N	246	6150
110227	2	2	09/13/91	23	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	47	1175
110227	2	2	09/13/91	23	12918	SG	POLYDORA CORNUTA	5001430498	N	3	75
110227	2	2	09/13/91	23	12918	SG	PYGOSPIO ELEGANS	5001431302	N	76	1900
110227	2	2	09/13/91	23	12918	SG	SPIOSETOSA	5001430704	N	1	25
110227	2	2	09/13/91	23	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3	75
110227	2	2	09/13/91	23	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110227	3	3	09/13/91	23	12918	SG	ACMAEA TESTUDINALIS	5102050108	N	3	75
110227	3	3	09/13/91	23	12918	SG	AMPELISCA ABDITA	6169020108	N	76	1900
110227	3	3	09/13/91	23	12918	SG	AMPELISCA SP.	6169020199	N	12	300
110227	3	3	09/13/91	23	12918	SG	NAITIDES MACULATA	5001130106	N	10	250
110227	3	3	09/13/91	23	12918	SG	NAITIDES MUCOSA	5001130104	N	1	25
110227	3	3	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	339	8475
110227	3	3	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	33	825
110227	3	3	09/13/91	23	12918	SG	CAPITELLA CAPITATA	5001600101	N	9	225

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110227	3	3	09/13/91	23	12918	SG	CARCINUS MAENAS	6189010701	N	2	50
110227	3	3	09/13/91	23	12918	SG	CERIANTHUS SP.	3743010199	N	1	25
110227	3	3	09/13/91	23	12918	SG	CIRRATULIDAE	5001500000	N	9	225
110227	3	3	09/13/91	23	12918	SG	CLYMENELLA TORQUATA	5001630202	N	61	1525
110227	3	3	09/13/91	23	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110227	3	3	09/13/91	23	12918	SG	COROPHIUM BONELLI	6169150202	N	2	50
110227	3	3	09/13/91	23	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	65	1625
110227	3	3	09/13/91	23	12918	SG	CREPIDULA SP.	5103640299	N	3	75
110227	3	3	09/13/91	23	12918	SG	EDOTEA TRILOBA	6162020798	N	2	50
110227	3	3	09/13/91	23	12918	SG	ETEONE SP.	5001130299	N	5	125
110227	3	3	09/13/91	23	12918	SG	EULALIA VIRIDIS	5001130301	N	2	50
110227	3	3	09/13/91	23	12918	SG	EXOGONE HEBES	5001230707	N	40	1000
110227	3	3	09/13/91	23	12918	SG	GASTROPODA	51	N	44	1100
110227	3	3	09/13/91	23	12918	SG	GEMMA GEMMA	5515471301	N	1	25
110227	3	3	09/13/91	23	12918	SG	JAERA MARINA	6163060298	N	9	225
110227	3	3	09/13/91	23	12918	SG	LACUNA VINCTA	5103090305	N	1	25
110227	3	3	09/13/91	23	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	3	75
110227	3	3	09/13/91	23	12918	SG	LITTORINA LITTOREA	5103100108	N	9	225
110227	3	3	09/13/91	23	12918	SG	LYONSIA HYALINA	5520050206	N	5	125
110227	3	3	09/13/91	23	12918	SG	MALDANIDAE	500163	N	2	50
110227	3	3	09/13/91	23	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110227	3	3	09/13/91	23	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	19	475
110227	3	3	09/13/91	23	12918	SG	MICRODEUTOPUS SP.	6169060499	N	9	225
110227	3	3	09/13/91	23	12918	SG	MINUSPIO SP.	5001432699	N	2	50
110227	3	3	09/13/91	23	12918	SG	MYA ARENARIA	5517010201	N	1	25
110227	3	3	09/13/91	23	12918	SG	MYTILIDAE	5507010000	N	12	300
110227	3	3	09/13/91	23	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	1	25
110227	3	3	09/13/91	23	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110227	3	3	09/13/91	23	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110227	3	3	09/13/91	23	12918	SG	OLIGOCHAETA	5004000000	N	228	5700
110227	3	3	09/13/91	23	12918	SG	OXYUROSTY LISSMITHI	6154050801	N	1	25
110227	3	3	09/13/91	23	12918	SG	PARACAPRELLA TENUIS	6171010901	N	1	25
110227	3	3	09/13/91	23	12918	SG	PHOLOE MINUTA	5001060101	N	17	425
110227	3	3	09/13/91	23	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	77	1925
110227	3	3	09/13/91	23	12918	SG	POLYDORA CORNUTA	5001430498	N	4	100
110227	3	3	09/13/91	23	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110227	3	3	09/13/91	23	12918	SG	PYGOSPIO ELEGANS	5001431302	N	73	1825
110227	3	3	09/13/91	23	12918	SG	RHYNCHOCOELA	4300000000	N	13	325
110227	3	3	09/13/91	23	12918	SG	SPIO SETOSA	5001430704	N	4	100
110227	3	3	09/13/91	23	12918	SG	SPIOPHANES BOMBYX	5001431001	N	2	50
110227	3	3	09/13/91	23	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110227	3	3	09/13/91	23	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110227	3	3	09/13/91	23	12918	SG	TELLINA AGILIS	5515310205	N	15	375
110227	3	3	09/13/91	23	12918	SG	TURBELLARIA	3901000000	N	1	25
110227	4	4	09/13/91	23	12918	SG	AMPELISCA ABDITA	6169020108	N	3	75
110227	4	4	09/13/91	23	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110227	4	4	09/13/91	23	12918	SG	NAITIDES MACULATA	5001130106	N	5	125
110227	4	4	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	269	6725
110227	4	4	09/13/91	23	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	89	2225
110227	4	4	09/13/91	23	12918	SG	ASABELLIDES OCULATA	5001670802	N	2	50
110227	4	4	09/13/91	23	12918	SG	BIVALVIA	55	N	2	50
110227	4	4	09/13/91	23	12918	SG	BOTRYLLUS SCHLOSSERI	8406010701	C		
110227	4	4	09/13/91	23	12918	SG	BOWERBANKIA GRACILIS	7805010201	C		
110227	4	4	09/13/91	23	12918	SG	CAPITELLA CAPITATA	5001600101	N	9	225
110227	4	4	09/13/91	23	12918	SG	CAPRELLA PENANTIS	6171010727	N	1	25
110227	4	4	09/13/91	23	12918	SG	CARCINUS MAENAS	6189010701	N	5	125
110227	4	4	09/13/91	23	12918	SG	CIRRATULIDAE	5001500000	N	4	100
110227	4	4	09/13/91	23	12918	SG	CISTENIDES GRANULATA	5001660202	N	1	25
110227	4	4	09/13/91	23	12918	SG	CLYMENELLA TORQUATA	5001630202	N	52	1300
110227	4	4	09/13/91	23	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	6	150
110227	4	4	09/13/91	23	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	16	400
110227	4	4	09/13/91	23	12918	SG	COROPHIUM SP.	6169150299	N	5	125
110227	4	4	09/13/91	23	12918	SG	CREPIDULA SP.	5103640299	N	4	100
110227	4	4	09/13/91	23	12918	SG	EDOTEA TRILOBA	6162020798	N	1	25
110227	4	4	09/13/91	23	12918	SG	ELECTRA PILOSA	7815050103	C		
110227	4	4	09/13/91	23	12918	SG	ETEONE SP.	5001130299	N	1	25
110227	4	4	09/13/91	23	12918	SG	EXOGONE HEBES	5001230707	N	12	300
110227	4	4	09/13/91	23	12918	SG	GASTROPODA	51	N	163	4075
110227	4	4	09/13/91	23	12918	SG	HIATELLA SP.	5517060299	N	1	25
110227	4	4	09/13/91	23	12918	SG	IDOTEA BALTHICA	6162020308	N	1	25
110227	4	4	09/13/91	23	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	4	100
110227	4	4	09/13/91	23	12918	SG	JAERA MARINA	6163060298	N	48	1200
110227	4	4	09/13/91	23	12918	SG	LEPIDONOTUS SQUAMATUS	5001021103	N	1	25
110227	4	4	09/13/91	23	12918	SG	LITTORINA LITTOREA	5103100108	N	1	25
110227	4	4	09/13/91	23	12918	SG	LYONSIA HYALINA	5520050206	N	8	200
110227	4	4	09/13/91	23	12918	SG	MALDANIDAE	500163	N	1	25
110227	4	4	09/13/91	23	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110227	4	4	09/13/91	23	12918	SG	MEMBRANIPORA MEMBRANACEA	7815040101	C		
110227	4	4	09/13/91	23	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	13	325
110227	4	4	09/13/91	23	12918	SG	MICRODEUTOPUS SP.	6169060499	N	9	225
110227	4	4	09/13/91	23	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110227	4	4	09/13/91	23	12918	SG	MYA ARENARIA	5517010201	N	2	50
110227	4	4	09/13/91	23	12918	SG	MYTILIDAE	5507010000	N	788	19700
110227	4	4	09/13/91	23	12918	SG	NAINERIS QUADRICUSPIDA	5001400202	N	1	25
110227	4	4	09/13/91	23	12918	SG	NEREIDAE	500124	N	1	25
110227	4	4	09/13/91	23	12918	SG	OLIGOCHAETA	5004000000	N	238	5950
110227	4	4	09/13/91	23	12918	SG	PARACAPRELLA TENUIS	6171010901	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110227	4	4	09/13/91	23	12918	SG	PHOLOE MINUTA	5001060101	N	7	175
110227	4	4	09/13/91	23	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	43	1075
110227	4	4	09/13/91	23	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110227	4	4	09/13/91	23	12918	SG	PYGOSPIO ELEGANS	5001431302	N	89	2225
110227	4	4	09/13/91	23	12918	SG	RHYNCHOCOELA	4300000000	N	13	325
110227	4	4	09/13/91	23	12918	SG	SOLEMYA SP.	5504010199	N	1	25
110227	4	4	09/13/91	23	12918	SG	SPIO SETOSA	5001430704	N	2	50
110227	4	4	09/13/91	23	12918	SG	SPIOPHANES BOMBYX	5001431001	N	1	25
110227	4	4	09/13/91	23	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	4	100
110227	4	4	09/13/91	23	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110228	1	1	09/13/91	22	12918	SG	AMPELISCA ABDITA	6169020108	N	4	100
110228	1	1	09/13/91	22	12918	SG	NAITIDES MACULATA	5001130106	N	7	175
110228	1	1	09/13/91	22	12918	SG	ANOMIA SP.	5509090299	N	1	25
110228	1	1	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	6	150
110228	1	1	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	3	75
110228	1	1	09/13/91	22	12918	SG	BIVALVIA	55	N	1	25
110228	1	1	09/13/91	22	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110228	1	1	09/13/91	22	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	1	25
110228	1	1	09/13/91	22	12918	SG	CIRRATULIDAE	5001500000	N	18	450
110228	1	1	09/13/91	22	12918	SG	CISTENIDES GRANULATA	5001660202	N	2	50
110228	1	1	09/13/91	22	12918	SG	CLYMENELLA TORQUATA	5001630202	N	108	2700
110228	1	1	09/13/91	22	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	5	125
110228	1	1	09/13/91	22	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	2	50
110228	1	1	09/13/91	22	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110228	1	1	09/13/91	22	12918	SG	CRENELLA SP.	5507010299	N	5	125
110228	1	1	09/13/91	22	12918	SG	DENDROBEANIA MURRAYANA	7815250201	C		
110228	1	1	09/13/91	22	12918	SG	DEXAMINE THEA	6169170401	N	3	75
110228	1	1	09/13/91	22	12918	SG	EDOTEA TRILOBA	6162020798	N	2	50
110228	1	1	09/13/91	22	12918	SG	ELECTRA PILOSA	7815050103	C		
110228	1	1	09/13/91	22	12918	SG	ENSIS DIRECTUS	5515290301	N	1	25
110228	1	1	09/13/91	22	12918	SG	ETEONE SP.	5001130299	N	1	25
110228	1	1	09/13/91	22	12918	SG	EXOGONE HEBES	5001230707	N	26	650
110228	1	1	09/13/91	22	12918	SG	GASTROPODA	51	N	4	100
110228	1	1	09/13/91	22	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110228	1	1	09/13/91	22	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110228	1	1	09/13/91	22	12918	SG	ISCHYROCERUS ANGUIPES	6169270202	N	1	25
110228	1	1	09/13/91	22	12918	SG	JAERA MARINA	6163060298	N	2	50
110228	1	1	09/13/91	22	12918	SG	LACUNA VINCTA	5103090305	N	23	575
110228	1	1	09/13/91	22	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	3	75
110228	1	1	09/13/91	22	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	3	75
110228	1	1	09/13/91	22	12918	SG	LEPTOGNATHA CAECA	6157020201	N	1	25
110228	1	1	09/13/91	22	12918	SG	LUNATIA SP.	5103760499	N	1	25
110228	1	1	09/13/91	22	12918	SG	LYONSIA SP.	5520050299	N	3	75
110228	1	1	09/13/91	22	12918	SG	MACOMA SP.	5515310199	N	1	25
110228	1	1	09/13/91	22	12918	SG	MALDANIDAE	500163	N	13	325
110228	1	1	09/13/91	22	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110228	1	1	09/13/91	22	12918	SG	MEMBRANIPORA MEMBRANACEA	7815040101	C		
110228	1	1	09/13/91	22	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110228	1	1	09/13/91	22	12918	SG	MYA ARENARIA	5517010201	N	2	50
110228	1	1	09/13/91	22	12918	SG	MYTILIDAE	5507010000	N	164	4100
110228	1	1	09/13/91	22	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110228	1	1	09/13/91	22	12918	SG	NEPHTYS CAECA	5001250103	N	1	25
110228	1	1	09/13/91	22	12918	SG	NEPHTYS CILIATA	5001250102	N	3	75
110228	1	1	09/13/91	22	12918	SG	NEREIDAE	500124	N	1	25
110228	1	1	09/13/91	22	12918	SG	OLIGOCHAETA	5004000000	N	33	825
110228	1	1	09/13/91	22	12918	SG	OPHIUROIDEA	8120	N	1	25
110228	1	1	09/13/91	22	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	2	50
110228	1	1	09/13/91	22	12918	SG	PHERUSA AFFINIS	5001540304	N	2	50
110228	1	1	09/13/91	22	12918	SG	PHOLOE MINUTA	5001060101	N	36	900
110228	1	1	09/13/91	22	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110228	1	1	09/13/91	22	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110228	1	1	09/13/91	22	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	3	75
110228	1	1	09/13/91	22	12918	SG	PRIONOSPIO SP.	5001430599	N	1	25
110228	1	1	09/13/91	22	12918	SG	PYGOSPIO ELEGANS	5001431302	N	105	2625
110228	1	1	09/13/91	22	12918	SG	RHYNCHOCOELA	4300000000	N	8	200
110228	1	1	09/13/91	22	12918	SG	SPIOPHANES BOMBYX	5001431001	N	207	5175
110228	1	1	09/13/91	22	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	7	175
110228	1	1	09/13/91	22	12918	SG	TELLINA AGILIS	5515310205	N	35	875
110228	1	1	09/13/91	22	12918	SG	TURBELLARIA	3901000000	N	5	125
110228	1	1	09/13/91	22	12918	SG	UNCIOLA IRRORATA	6169150703	N	2	50
110228	2	2	09/13/91	22	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110228	2	2	09/13/91	22	12918	SG	ANOMIA SP.	5509090299	N	1	25
110228	2	2	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	10	250
110228	2	2	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	4	100
110228	2	2	09/13/91	22	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110228	2	2	09/13/91	22	12918	SG	CIRRATULIDAE	5001500000	N	15	375
110228	2	2	09/13/91	22	12918	SG	CLYMENELLA TORQUATA	5001630202	N	16	400
110228	2	2	09/13/91	22	12918	SG	CREPIDULA SP.	5103640299	N	2	50
110228	2	2	09/13/91	22	12918	SG	DISPORELLA HISPIDA	7813010298	C		
110228	2	2	09/13/91	22	12918	SG	EDOTEA TRILOBA	6162020798	N	2	50
110228	2	2	09/13/91	22	12918	SG	ETEONE LONGA	5001130205	N	1	25
110228	2	2	09/13/91	22	12918	SG	EXOGONE HEBES	5001230707	N	16	400
110228	2	2	09/13/91	22	12918	SG	GASTROPODA	51	N	2	50
110228	2	2	09/13/91	22	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110228	2	2	09/13/91	22	12918	SG	IDOTEA BALTHICA	6162020308	N	1	25
110228	2	2	09/13/91	22	12918	SG	LACUNA VINCTA	5103090305	N	11	275
110228	2	2	09/13/91	22	12918	SG	MINUSPIO SP.	5001432699	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110228	2	2	09/13/91	22	12918	SG	MYTILIDAE	5507010000	N	140	3500
110228	2	2	09/13/91	22	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110228	2	2	09/13/91	22	12918	SG	OLIGOCHAETA	5004000000	N	6	150
110228	2	2	09/13/91	22	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110228	2	2	09/13/91	22	12918	SG	PHOLOE MINUTA	5001060101	N	4	100
110228	2	2	09/13/91	22	12918	SG	PYGOSPIO ELEGANS	5001431302	N	13	325
110228	2	2	09/13/91	22	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110228	2	2	09/13/91	22	12918	SG	SPIO SETOSA	5001430704	N	1	25
110228	2	2	09/13/91	22	12918	SG	SPIONIDAE	500143	N	2	50
110228	2	2	09/13/91	22	12918	SG	SPIOPHANES BOMBYX	5001431001	N	37	925
110228	2	2	09/13/91	22	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	3	75
110228	2	2	09/13/91	22	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110228	2	2	09/13/91	22	12918	SG	TELLINA AGILIS	5515310205	N	21	525
110228	2	2	09/13/91	22	12918	SG	TURTONIA MINUTA	5515140101	N	1	25
110228	3	3	09/13/91	22	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110228	3	3	09/13/91	22	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110228	3	3	09/13/91	22	12918	SG	ANOMIA SP.	5509090299	N	150	3750
110228	3	3	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	11	275
110228	3	3	09/13/91	22	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110228	3	3	09/13/91	22	12918	SG	CIRRATULIDAE	5001500000	N	3	75
110228	3	3	09/13/91	22	12918	SG	CLYMENELLA TORQUATA	5001630202	N	6	150
110228	3	3	09/13/91	22	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110228	3	3	09/13/91	22	12918	SG	EXOGONE HEBES	5001230707	N	4	100
110228	3	3	09/13/91	22	12918	SG	GASTROPODA	51	N	1	25
110228	3	3	09/13/91	22	12918	SG	GLYCERAD IBRANCHIATA	5001270105	N	1	25
110228	3	3	09/13/91	22	12918	SG	LACUNA VINCTA	5103090305	N	2	50
110228	3	3	09/13/91	22	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110228	3	3	09/13/91	22	12918	SG	MYA ARENARIA	5517010201	N	1	25
110228	3	3	09/13/91	22	12918	SG	MYTILIDAE	5507010000	N	1	25
110228	3	3	09/13/91	22	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	38	950
110228	3	3	09/13/91	22	12918	SG	NEPHTYS CILIATA	5001250102	N	3	75
110228	3	3	09/13/91	22	12918	SG	OLIGOCHAETA	5004000000	N	5	125
110228	3	3	09/13/91	22	12918	SG	PARAONIS FULGENS	5001410302	N	1	25
110228	3	3	09/13/91	22	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110228	3	3	09/13/91	22	12918	SG	PYGOSPIO ELEGANS	5001431302	N	7	175
110228	3	3	09/13/91	22	12918	SG	SPIONIDAE	500143	N	5	125
110228	3	3	09/13/91	22	12918	SG	SPIOPHANES BOMBYX	5001431001	N	45	1125
110228	3	3	09/13/91	22	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	1	25
110228	3	3	09/13/91	22	12918	SG	TELLINA AGILIS	5515310205	N	41	1025
110228	4	4	09/13/91	22	12918	SG	NAITIDES MUCOSA	5001130104	N	2	50
110228	4	4	09/13/91	22	12918	SG	ANOMIA SP.	5509090299	N	1	25
110228	4	4	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	19	475
110228	4	4	09/13/91	22	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110228	4	4	09/13/91	22	12918	SG	CIRRATULIDAE	5001500000	N	8	200
110228	4	4	09/13/91	22	12918	SG	CLYMENELLA TORQUATA	5001630202	N	5	125
110228	4	4	09/13/91	22	12918	SG	DENDROBEANIA MURRAYANA	7815250201	C		
110228	4	4	09/13/91	22	12918	SG	ETEONE LONGA	5001130205	N	1	25
110228	4	4	09/13/91	22	12918	SG	EXOGONE HEBES	5001230707	N	5	125
110228	4	4	09/13/91	22	12918	SG	GAMMARUS SP.	6169210799	N	1	25
110228	4	4	09/13/91	22	12918	SG	GASTROPODA	51	N	1	25
110228	4	4	09/13/91	22	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110228	4	4	09/13/91	22	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110228	4	4	09/13/91	22	12918	SG	MYTILIDAE	5507010000	N	2	50
110228	4	4	09/13/91	22	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	6	150
110228	4	4	09/13/91	22	12918	SG	NEPHTYS CAECA	5001250103	N	2	50
110228	4	4	09/13/91	22	12918	SG	NEPHTYS CILIATA	5001250102	N	5	125
110228	4	4	09/13/91	22	12918	SG	OLIGOCHAETA	5004000000	N	11	275
110228	4	4	09/13/91	22	12918	SG	PARAONIS FULGENS	5001410302	N	1	25
110228	4	4	09/13/91	22	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110228	4	4	09/13/91	22	12918	SG	PYGOSPIO ELEGANS	5001431302	N	16	400
110228	4	4	09/13/91	22	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110228	4	4	09/13/91	22	12918	SG	SPIOPHANES BOMBYX	5001431001	N	52	1300
110228	4	4	09/13/91	22	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2	50
110228	4	4	09/13/91	22	12918	SG	TELLINAAGILIS	5515310205	N	75	1875
110221	1	1	09/16/91	1	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110221	1	1	09/16/91	1	12918	SG	ANOMIA SP.	5509090299	N	2	50
110221	1	1	09/16/91	1	12918	SG	BOTRYLLUS SCHLOSSERI	8406010701	C		
110221	1	1	09/16/91	1	12918	SG	BOWERBANKIA GRACILIS	7805010201	C		
110221	1	1	09/16/91	1	12918	SG	CAPITELLA CAPITATA	5001600101	N	75	1875
110221	1	1	09/16/91	1	12918	SG	CIRRATULIDAE	5001500000	N	47	1175
110221	1	1	09/16/91	1	12918	SG	CIRRIPEDIA	6130	N	1	25
110221	1	1	09/16/91	1	12918	SG	GAMMARUS SP.	6169210799	N	1	25
110221	1	1	09/16/91	1	12918	SG	GASTROPODA	51	N	1	25
110221	1	1	09/16/91	1	12918	SG	HALECIUM DIMINUTIVUM	3704060198	C		
110221	1	1	09/16/91	1	12918	SG	JASSA MARMORATA	6169270302	N	1	25
110221	1	1	09/16/91	1	12918	SG	LITTORINA LITTOREA	5103100108	N	4	100
110221	1	1	09/16/91	1	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110221	1	1	09/16/91	1	12918	SG	MICRODEUTOPUS SP.	6169060499	N	2	50
110221	1	1	09/16/91	1	12918	SG	MYA ARENARIA	5517010201	N	1	25
110221	1	1	09/16/91	1	12918	SG	MYTILIDAE	5507010000	N	2	50
110221	1	1	09/16/91	1	12918	SG	NEANTHES VIRENS	5001240302	N	3	75
110221	1	1	09/16/91	1	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110221	1	1	09/16/91	1	12918	SG	OLIGOCHAETA	5004000000	N	369	9225
110221	1	1	09/16/91	1	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	1	25
110221	1	1	09/16/91	1	12918	SG	POLYDORA CORNUTA	5001430498	N	5	125
110221	1	1	09/16/91	1	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110221	1	1	09/16/91	1	12918	SG	SPIO SETOSA	5001430704	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110221	1	1	09/16/91	1	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	111	2775
110221	2	2	09/16/91	1	12918	SG	CAPITELLA CAPITATA	5001600101	N	42	1050
110221	2	2	09/16/91	1	12918	SG	CIRRATULIDAE	5001500000	N	8	200
110221	2	2	09/16/91	1	12918	SG	LEITOSCOLOPLOSROBUSTUS	5001409898	N	2	50
110221	2	2	09/16/91	1	12918	SG	MYTILIDAE	5507010000	N	1	25
110221	2	2	09/16/91	1	12918	SG	NEANTHES VIRENS	5001240302	N	4	100
110221	2	2	09/16/91	1	12918	SG	OLIGOCHAETA	5004000000	N	271	6775
110221	2	2	09/16/91	1	12918	SG	POLYDORA CORNUTA	5001430498	N	3	75
110221	2	2	09/16/91	1	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110221	2	2	09/16/91	1	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	49	1225
110221	3	3	09/16/91	1	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110221	3	3	09/16/91	1	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110221	3	3	09/16/91	1	12918	SG	CAPITELLA CAPITATA	5001600101	N	51	1275
110221	3	3	09/16/91	1	12918	SG	CIRRATULIDAE	5001500000	N	214	5350
110221	3	3	09/16/91	1	12918	SG	GAMMARUS SP.	6169210799	N	1	25
110221	3	3	09/16/91	1	12918	SG	LEITOSCOLOPLOS ROBUSTUS	5001409898	N	1	25
110221	3	3	09/16/91	1	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110221	3	3	09/16/91	1	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110221	3	3	09/16/91	1	12918	SG	MYTILIDAE	5507010000	N	2	50
110221	3	3	09/16/91	1	12918	SG	NEANTHES VIRENS	5001240302	N	2	50
110221	3	3	09/16/91	1	12918	SG	NEPHTYSCAECA	5001250103	N	1	25
110221	3	3	09/16/91	1	12918	SG	NEREIDAE	500124	N	3	75
110221	3	3	09/16/91	1	12918	SG	OLIGOCHAETA	5004000000	N	780	19500
110221	3	3	09/16/91	1	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110221	3	3	09/16/91	1	12918	SG	POLYDORA CORNUTA	5001430498	N	64	1600
110221	3	3	09/16/91	1	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110221	3	3	09/16/91	1	12918	SG	SCOLETOMA SP.	5001319899	N	1	25
110221	3	3	09/16/91	1	12918	SG	SPIO SETOSA	5001430704	N	1	25
110221	3	3	09/16/91	1	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	305	7625
110221	3	3	09/16/91	1	12918	SG	TELLINA AGILIS	5515310205	N	1	25
110221	4	4	09/16/91	1	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110221	4	4	09/16/91	1	12918	SG	CAPITELLA CAPITATA	5001600101	N	26	650
110221	4	4	09/16/91	1	12918	SG	CIRRATULIDAE	5001500000	N	19	475
110221	4	4	09/16/91	1	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110221	4	4	09/16/91	1	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110221	4	4	09/16/91	1	12918	SG	LITTORINA LITTOREA	5103100108	N	19	475
110221	4	4	09/16/91	1	12918	SG	MYTILIDAE	5507010000	N	1	25
110221	4	4	09/16/91	1	12918	SG	NEREIDAE	500124	N	2	50
110221	4	4	09/16/91	1	12918	SG	OLIGOCHAETA	5004000000	N	187	4675
110221	4	4	09/16/91	1	12918	SG	POLYDORA CORNUTA	5001430498	N	19	475
110221	4	4	09/16/91	1	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	105	2625
110229	1	1	09/16/91	9	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110229	1	1	09/16/91	9	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110229	1	1	09/16/91	9	12918	SG	ANOMIA SP.	5509090299	N	9	225
110229	1	1	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110229	1	1	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	2	50
110229	1	1	09/16/91	9	12918	SG	CIRRATULIDAE	5001500000	N	12	300
110229	1	1	09/16/91	9	12918	SG	CIRRATULUS GRANDIS	5001500104	N	52	1300
110229	1	1	09/16/91	9	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110229	1	1	09/16/91	9	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110229	1	1	09/16/91	9	12918	SG	COROPHIUM SP.	6169150299	N	2	50
110229	1	1	09/16/91	9	12918	SG	ETEONE SP.	5001130299	N	1	25
110229	1	1	09/16/91	9	12918	SG	EUCLYMENE ZONALIS	5001631103	N	3	75
110229	1	1	09/16/91	9	12918	SG	EXOGONE HEBES	5001230707	N	1	25
110229	1	1	09/16/91	9	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110229	1	1	09/16/91	9	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110229	1	1	09/16/91	9	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110229	1	1	09/16/91	9	12918	SG	MYA ARENARIA	5517010201	N	2	50
110229	1	1	09/16/91	9	12918	SG	MYTILIDAE	5507010000	N	9	225
110229	1	1	09/16/91	9	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	1	25
110229	1	1	09/16/91	9	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110229	1	1	09/16/91	9	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110229	1	1	09/16/91	9	12918	SG	OLIGOCHAETA	5004000000	N	7	175
110229	1	1	09/16/91	9	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110229	1	1	09/16/91	9	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	2	50
110229	1	1	09/16/91	9	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	3	75
110229	1	1	09/16/91	9	12918	SG	RHYNCHOCOELA	4300000000	N	3	75
110229	1	1	09/16/91	9	12918	SG	SCOLETOMA HEBES	5001319898	N	8	200
110229	1	1	09/16/91	9	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110229	1	1	09/16/91	9	12918	SG	TELLINA AGILIS	5515310205	N	5	125
110229	2	2	09/16/91	9	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110229	2	2	09/16/91	9	12918	SG	NAITIDES MACULATA	5001130106	N	1	25
110229	2	2	09/16/91	9	12918	SG	ANOMIA SP.	5509090299	N	9	225
110229	2	2	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	8	200
110229	2	2	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	9	225
110229	2	2	09/16/91	9	12918	SG	ASTARTE SP.	5515190199	N	1	25
110229	2	2	09/16/91	9	12918	SG	BIVALVIA	55	N	1	25
110229	2	2	09/16/91	9	12918	SG	CAPITELLA CAPITATA	5001600101	N	5	125
110229	2	2	09/16/91	9	12918	SG	CERASTODERMA PINNULATUM	5515220601	N	10	250
110229	2	2	09/16/91	9	12918	SG	CIRRATULIDAE	5001500000	N	36	900
110229	2	2	09/16/91	9	12918	SG	CIRRATULUS GRANDIS	5001500104	N	43	1075
110229	2	2	09/16/91	9	12918	SG	CISTENIDES GRANULATA	5001660202	N	1	25
110229	2	2	09/16/91	9	12918	SG	CLYMENELLA TORQUATA	5001630202	N	5	125
110229	2	2	09/16/91	9	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	4	100
110229	2	2	09/16/91	9	12918	SG	COROPHIUM BONELLI	6169150202	N	2	50
110229	2	2	09/16/91	9	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110229	2	2	09/16/91	9	12918	SG	COROPHIUM SP.	6169150299	N	7	175

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110229	2	2	09/16/91	9	12918	SG	CREPIDULA SP.	5103640299	N	1	25
110229	2	2	09/16/91	9	12918	SG	DEXAMINE THEA	6169170401	N	4	100
110229	2	2	09/16/91	9	12918	SG	ETEONE SP.	5001130299	N	3	75
110229	2	2	09/16/91	9	12918	SG	EXOGONE HEBES	5001230707	N	4	100
110229	2	2	09/16/91	9	12918	SG	GASTROPODA	51	N	4	100
110229	2	2	09/16/91	9	12918	SG	HARMOTHOE SP.	5001020899	N	1	25
110229	2	2	09/16/91	9	12918	SG	HIATELLA SP.	5517060299	N	9	225
110229	2	2	09/16/91	9	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110229	2	2	09/16/91	9	12918	SG	LYONSIA HYALINA	5520050206	N	18	450
110229	2	2	09/16/91	9	12918	SG	LYONSIA SP.	5520050299	N	2	50
110229	2	2	09/16/91	9	12918	SG	MALDANIDAE	500163	N	7	175
110229	2	2	09/16/91	9	12918	SG	MEDIOMASTUS SP.	5001600499	N	15	375
110229	2	2	09/16/91	9	12918	SG	MEMBRANIPORA MEMBRANACEA	7815040101	C		
110229	2	2	09/16/91	9	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110229	2	2	09/16/91	9	12918	SG	MYA ARENARIA	5517010201	N	3	75
110229	2	2	09/16/91	9	12918	SG	MYTILIDAE	5507010000	N	231	5775
110229	2	2	09/16/91	9	12918	SG	NEANTHES VIRENS	5001240302	N	2	50
110229	2	2	09/16/91	9	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110229	2	2	09/16/91	9	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110229	2	2	09/16/91	9	12918	SG	NEREIDAE	500124	N	1	25
110229	2	2	09/16/91	9	12918	SG	NINOE NIGRIPES	5001310204	N	4	100
110229	2	2	09/16/91	9	12918	SG	NUCULA DELPHINODONTA	5502020206	N	9	225
110229	2	2	09/16/91	9	12918	SG	NUCULA SP.	5502020299	N	7	175
110229	2	2	09/16/91	9	12918	SG	OLIGOCHAETA	5004000000	N	584	14600
110229	2	2	09/16/91	9	12918	SG	PHERUSA AFFINIS	5001540304	N	1	25
110229	2	2	09/16/91	9	12918	SG	PHOLOE MINUTA	5001060101	N	6	150
110229	2	2	09/16/91	9	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	7	175
110229	2	2	09/16/91	9	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	5	125
110229	2	2	09/16/91	9	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110229	2	2	09/16/91	9	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110229	2	2	09/16/91	9	12918	SG	SCOLETOMA HEBES	5001319898	N	27	675
110229	2	2	09/16/91	9	12918	SG	SCOLETOMA SP.	5001319899	N	30	750
110229	2	2	09/16/91	9	12918	SG	SOLEMYA SP.	5504010199	N	1	25
110229	2	2	09/16/91	9	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	9	225
110229	2	2	09/16/91	9	12918	SG	TELLINA AGILIS	5515310205	N	6	150
110229	2	2	09/16/91	9	12918	SG	TURBELLARIA	3901000000	N	1	25
110229	3	3	09/16/91	9	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	1	25
110229	3	3	09/16/91	9	12918	SG	ANAITIDES SP.	5001130199	N	5	125
110229	3	3	09/16/91	9	12918	SG	ANOMIA SP.	5509090299	N	24	600
110229	3	3	09/16/91	9	12918	SG	APLIDIUM SP.	8403020199	C		
110229	3	3	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	19	475
110229	3	3	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	3	75
110229	3	3	09/16/91	9	12918	SG	BIVALVIA	55	N	2	50
110229	3	3	09/16/91	9	12918	SG	CANCER IRRORATUS	6188030108	N	1	25
110229	3	3	09/16/91	9	12918	SG	CAPITELLA CAPITATA	5001600101	N	14	350
110229	3	3	09/16/91	9	12918	SG	CERASTO DERMAPINNULATUM	5515220601	N	3	75
110229	3	3	09/16/91	9	12918	SG	CIRRATULIDAE	5001500000	N	22	550
110229	3	3	09/16/91	9	12918	SG	CIRRATULUS GRANDIS	5001500104	N	24	600
110229	3	3	09/16/91	9	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110229	3	3	09/16/91	9	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110229	3	3	09/16/91	9	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110229	3	3	09/16/91	9	12918	SG	COROPHIUM SP.	6169150299	N	9	225
110229	3	3	09/16/91	9	12918	SG	CRIBRILINA PUNCTATA	7815300102	C		
110229	3	3	09/16/91	9	12918	SG	DEXAMINE THEA	6169170401	N	1	25
110229	3	3	09/16/91	9	12918	SG	ETEONE SP.	5001130299	N	3	75
110229	3	3	09/16/91	9	12918	SG	EUCLYMENE ZONALIS	5001631103	N	1	25
110229	3	3	09/16/91	9	12918	SG	EXOGONE HEBES	5001230707	N	5	125
110229	3	3	09/16/91	9	12918	SG	GASTROPODA	51	N	5	125
110229	3	3	09/16/91	9	12918	SG	HIATELLA SP.	5517060299	N	8	200
110229	3	3	09/16/91	9	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110229	3	3	09/16/91	9	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	2	50
110229	3	3	09/16/91	9	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110229	3	3	09/16/91	9	12918	SG	LYONSIA HYALINA	5520050206	N	5	125
110229	3	3	09/16/91	9	12918	SG	MALDANIDAE	500163	N	1	25
110229	3	3	09/16/91	9	12918	SG	MEDIOMASTUS SP.	5001600499	N	9	225
110229	3	3	09/16/91	9	12918	SG	MEMBRANIPORA MEMBRANACEA	7815040101	C		
110229	3	3	09/16/91	9	12918	SG	MYA ARENARIA	5517010201	N	1	25
110229	3	3	09/16/91	9	12918	SG	MYTILIDAE	5507010000	N	213	5325
110229	3	3	09/16/91	9	12918	SG	NEPHTYIDAE	5001250000	N	1	25
110229	3	3	09/16/91	9	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110229	3	3	09/16/91	9	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110229	3	3	09/16/91	9	12918	SG	NUCULA DELPHINODONTA	5502020206	N	6	150
110229	3	3	09/16/91	9	12918	SG	NUCULA SP.	5502020299	N	1	25
110229	3	3	09/16/91	9	12918	SG	OLIGOCHAETA	5004000000	N	191	4775
110229	3	3	09/16/91	9	12918	SG	OPHIUROIDEA	8120	N	1	25
110229	3	3	09/16/91	9	12918	SG	PHOLOEMINUTA	5001060101	N	2	50
110229	3	3	09/16/91	9	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	17	425
110229	3	3	09/16/91	9	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	1	25
110229	3	3	09/16/91	9	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110229	3	3	09/16/91	9	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110229	3	3	09/16/91	9	12918	SG	SCOLETOMA HEBES	5001319898	N	15	375
110229	3	3	09/16/91	9	12918	SG	SCOLETOMA SP.	5001319899	N	8	200
110229	3	3	09/16/91	9	12918	SG	SPISULA SOLIDISSIMA	5515250102	N	1	25
110229	3	3	09/16/91	9	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	4	100
110229	3	3	09/16/91	9	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110229	3	3	09/16/91	9	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110229	3	3	09/16/91	9	12918	SG	TURBELLARIA	3901000000	N	1	25

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110229	4	4	09/16/91	9	12918	SG	NAITIDES MACULATA	5001130106	N	1	25
110229	4	4	09/16/91	9	12918	SG	ANOMIA SP.	5509090299	N	43	1075
110229	4	4	09/16/91	9	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	13	325
110229	4	4	09/16/91	9	12918	SG	CAPITELLA CAPITATA	5001600101	N	7	175
110229	4	4	09/16/91	9	12918	SG	CIRRATULIDAE	5001500000	N	23	575
110229	4	4	09/16/91	9	12918	SG	CIRRATULUS GRANDIS	5001500104	N	37	925
110229	4	4	09/16/91	9	12918	SG	CLYMENELLA TORQUATA	5001630202	N	1	25
110229	4	4	09/16/91	9	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110229	4	4	09/16/91	9	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110229	4	4	09/16/91	9	12918	SG	COROPHIUM SP.	6169150299	N	2	50
110229	4	4	09/16/91	9	12918	SG	EXOGONE HEBES	5001230707	N	2	50
110229	4	4	09/16/91	9	12918	SG	HETEROMASTUS FILIFORMIS	5001600201	N	2	50
110229	4	4	09/16/91	9	12918	SG	HIATELLA SP.	5517060299	N	1	25
110229	4	4	09/16/91	9	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110229	4	4	09/16/91	9	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110229	4	4	09/16/91	9	12918	SG	LYONSIA SP.	5520050299	N	4	100
110229	4	4	09/16/91	9	12918	SG	MEDIOMASTUS SP.	5001600499	N	9	225
110229	4	4	09/16/91	9	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	1	25
110229	4	4	09/16/91	9	12918	SG	MYA ARENARIA	5517010201	N	2	50
110229	4	4	09/16/91	9	12918	SG	MYTILIDAE	5507010000	N	33	825
110229	4	4	09/16/91	9	12918	SG	NEPHTYIDAE	5001250000	N	2	50
110229	4	4	09/16/91	9	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110229	4	4	09/16/91	9	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110229	4	4	09/16/91	9	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110229	4	4	09/16/91	9	12918	SG	NUCULA DELPHINODONTA	5502020206	N	10	250
110229	4	4	09/16/91	9	12918	SG	NUCULA SP.	5502020299	N	3	75
110229	4	4	09/16/91	9	12918	SG	OLIGOCHAETA	5004000000	N	210	5250
110229	4	4	09/16/91	9	12918	SG	PHERUSA AFFINIS	5001540304	N	2	50
110229	4	4	09/16/91	9	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110229	4	4	09/16/91	9	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	5	125
110229	4	4	09/16/91	9	12918	SG	POLYDORA QUADRILOBATA	5001430408	N	2	50
110229	4	4	09/16/91	9	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110229	4	4	09/16/91	9	12918	SG	SCOLETOMA HEBES	5001319898	N	27	675
110229	4	4	09/16/91	9	12918	SG	SCOLETOMA SP.	5001319899	N	12	300
110229	4	4	09/16/91	9	12918	SG	SPIOSETOSA	5001430704	N	1	25
110229	4	4	09/16/91	9	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3	75
110229	4	4	09/16/91	9	12918	SG	SYLLIS CORNUTA	5001230306	N	1	25
110229	4	4	09/16/91	9	12918	SG	TANAIDACEA	6155	N	1	25
110229	4	4	09/16/91	9	12918	SG	TELLINA AGILIS	5515310205	N	5	125
110230	1	1	09/16/91	2	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	7	175
110230	1	1	09/16/91	2	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110230	1	1	09/16/91	2	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	2	50
110230	1	1	09/16/91	2	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110230	1	1	09/16/91	2	12918	SG	CIRRATULIDAE	5001500000	N	3	75
110230	1	1	09/16/91	2	12918	SG	ETEONE LONGA	5001130205	N	1	25
110230	1	1	09/16/91	2	12918	SG	EUDENDRIUM RUGOSUM	3703080197	C		
110230	1	1	09/16/91	2	12918	SG	HARMOTHOE IMBRICATA	5001020806	N	1	25
110230	1	1	09/16/91	2	12918	SG	MACOMA SP.	5515310199	N	1	25
110230	1	1	09/16/91	2	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110230	1	1	09/16/91	2	12918	SG	MYTILIDAE	5507010000	N	11	275
110230	1	1	09/16/91	2	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110230	1	1	09/16/91	2	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110230	1	1	09/16/91	2	12918	SG	OLIGOCHAETA	5004000000	N	484	12100
110230	1	1	09/16/91	2	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	1	25
110230	1	1	09/16/91	2	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	2	50
110230	1	1	09/16/91	2	12918	SG	PHOTISMA CROCOXA	6169260208	N	8	200
110230	1	1	09/16/91	2	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	15	375
110230	1	1	09/16/91	2	12918	SG	PYGOSPIO ELEGANS	5001431302	N	1	25
110230	1	1	09/16/91	2	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110230	1	1	09/16/91	2	12918	SG	SCOLETOMA HEBES	5001319898	N	90	2250
110230	1	1	09/16/91	2	12918	SG	SCOLETOMA SP.	5001319899	N	138	3450
110230	1	1	09/16/91	2	12918	SG	SPIONIDAE	500143	N	1	25
110230	1	1	09/16/91	2	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	5441	136025
110230	1	1	09/16/91	2	12918	SG	STRONGYLOCENTROTUS DROEBACHIENSIS	8149030201	N	1	25
110230	1	1	09/16/91	2	12918	SG	TELLINA AGILIS	5515310205	N	7	175
110230	2	2	09/16/91	2	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	2	50
110230	2	2	09/16/91	2	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	1	25
110230	2	2	09/16/91	2	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110230	2	2	09/16/91	2	12918	SG	CIRRATULIDAE	5001500000	N	2	50
110230	2	2	09/16/91	2	12918	SG	ETEONE SP.	5001130299	N	1	25
110230	2	2	09/16/91	2	12918	SG	EUDENDRIUM SP.	3703080199	C		
110230	2	2	09/16/91	2	12918	SG	ISODICTYA DEICHMANNE	3663989898	C		
110230	2	2	09/16/91	2	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110230	2	2	09/16/91	2	12918	SG	MINUSPIO SP.	5001432699	N	1	25
110230	2	2	09/16/91	2	12918	SG	MYTILIDAE	5507010000	N	18	450
110230	2	2	09/16/91	2	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110230	2	2	09/16/91	2	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110230	2	2	09/16/91	2	12918	SG	OLIGOCHAETA	5004000000	N	185	4625
110230	2	2	09/16/91	2	12918	SG	PHOTISMA CROCOXA	6169260208	N	1	25
110230	2	2	09/16/91	2	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	9	225
110230	2	2	09/16/91	2	12918	SG	POLYNOIDAE	500102	N	1	25
110230	2	2	09/16/91	2	12918	SG	PYGOSPIO ELEGANS	5001431302	N	8	200
110230	2	2	09/16/91	2	12918	SG	SCOLETOMA HEBES	5001319898	N	52	1300
110230	2	2	09/16/91	2	12918	SG	SCOLETOMA SP.	5001319899	N	46	1150
110230	2	2	09/16/91	2	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2548	63700
110230	2	2	09/16/91	2	12918	SG	TELLINA AGILIS	5515310205	N	4	100
110230	3	3	09/16/91	2	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	3	75

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110230	3	3	09/16/91	2	12918	SG	AMPELISCA ABDITA	6169020108	N	5	125
110230	3	3	09/16/91	2	12918	SG	AMPELISCA SP.	6169020199	N	9	225
110230	3	3	09/16/91	2	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	6	150
110230	3	3	09/16/91	2	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	3	75
110230	3	3	09/16/91	2	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110230	3	3	09/16/91	2	12918	SG	CIRRATULIDAE	5001500000	N	4	100
110230	3	3	09/16/91	2	12918	SG	ETEONE LONGA	5001130205	N	2	50
110230	3	3	09/16/91	2	12918	SG	ETEONE SP.	5001130299	N	3	75
110230	3	3	09/16/91	2	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	1	25
110230	3	3	09/16/91	2	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	1	25
110230	3	3	09/16/91	2	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110230	3	3	09/16/91	2	12918	SG	MICRODEUTOPUS SP.	6169060499	N	1	25
110230	3	3	09/16/91	2	12918	SG	MYTILIDAE	5507010000	N	8	200
110230	3	3	09/16/91	2	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110230	3	3	09/16/91	2	12918	SG	NINOE NIGRIPES	5001310204	N	3	75
110230	3	3	09/16/91	2	12918	SG	OLIGOCHAETA	5004000000	N	792	19800
110230	3	3	09/16/91	2	12918	SG	ORCHOMENELLA PINGUIS	6169345203	N	1	25
110230	3	3	09/16/91	2	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110230	3	3	09/16/91	2	12918	SG	PHOLOE MINUTA	5001060101	N	1	25
110230	3	3	09/16/91	2	12918	SG	PHOTISMA CROCOXA	6169260208	N	18	450
110230	3	3	09/16/91	2	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	108	2700
110230	3	3	09/16/91	2	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110230	3	3	09/16/91	2	12918	SG	PYGOSPIO ELEGANS	5001431302	N	33	825
110230	3	3	09/16/91	2	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110230	3	3	09/16/91	2	12918	SG	SCOLETOMA HEBES	5001319898	N	117	2925
110230	3	3	09/16/91	2	12918	SG	SCOLETOMA SP.	5001319899	N	141	3525
110230	3	3	09/16/91	2	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	2365	59125
110230	3	3	09/16/91	2	12918	SG	TELLINA AGILIS	5515310205	N	9	225
110230	3	3	09/16/91	2	12918	SG	TURBELLARIA	3901000000	N	5	125
110230	4	4	09/16/91	2	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	4	100
110230	4	4	09/16/91	2	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110230	4	4	09/16/91	2	12918	SG	AMPELISCA SP.	6169020199	N	4	100
110230	4	4	09/16/91	2	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	6	150
110230	4	4	09/16/91	2	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	9	225
110230	4	4	09/16/91	2	12918	SG	BIVALVIA	55	N	1	25
110230	4	4	09/16/91	2	12918	SG	CAPITELLA CAPITATA	5001600101	N	3	75
110230	4	4	09/16/91	2	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	1	25
110230	4	4	09/16/91	2	12918	SG	COROPHIUM SP.	6169150299	N	2	50
110230	4	4	09/16/91	2	12918	SG	DEXAMINE THEA	6169170401	N	3	75
110230	4	4	09/16/91	2	12918	SG	ETEONE LONGA	5001130205	N	2	50
110230	4	4	09/16/91	2	12918	SG	ETEONE SP.	5001130299	N	2	50
110230	4	4	09/16/91	2	12918	SG	GAMMARUS SP.	6169210799	N	3	75
110230	4	4	09/16/91	2	12918	SG	GASTROPODA	51	N	4	100
110230	4	4	09/16/91	2	12918	SG	HIATELLA SP.	5517060299	N	1	25
110230	4	4	09/16/91	2	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110230	4	4	09/16/91	2	12918	SG	LYONSIA HYALINA	5520050206	N	2	50
110230	4	4	09/16/91	2	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110230	4	4	09/16/91	2	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	3	75
110230	4	4	09/16/91	2	12918	SG	MYA ARENARIA	5517010201	N	1	25
110230	4	4	09/16/91	2	12918	SG	MYTILIDAE	5507010000	N	241	6025
110230	4	4	09/16/91	2	12918	SG	NEPHTYS CILIATA	5001250102	N	1	25
110230	4	4	09/16/91	2	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110230	4	4	09/16/91	2	12918	SG	NINOE NIGRIPES	5001310204	N	8	200
110230	4	4	09/16/91	2	12918	SG	OLIGOCHAETA	5004000000	N	1063	26575
110230	4	4	09/16/91	2	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110230	4	4	09/16/91	2	12918	SG	PARACAPRELLA TENUIS	6171010901	N	2	50
110230	4	4	09/16/91	2	12918	SG	PHOLOE MINUTA	5001060101	N	3	75
110230	4	4	09/16/91	2	12918	SG	PHOTISMA CROCOXA	6169260208	N	3	75
110230	4	4	09/16/91	2	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	84	2100
110230	4	4	09/16/91	2	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110230	4	4	09/16/91	2	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110230	4	4	09/16/91	2	12918	SG	SCOLETOMA HEBES	5001319898	N	182	4550
110230	4	4	09/16/91	2	12918	SG	SCOLETOMA SP.	5001319899	N	197	4925
110230	4	4	09/16/91	2	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3616	90400
110230	4	4	09/16/91	2	12918	SG	TELLINA AGILIS	5515310205	N	18	450
110231	1	1	09/16/91	3	12918	SG	AMPELISCA ABDITA	6169020108	N	14	350
110231	1	1	09/16/91	3	12918	SG	AMPELISCA SP.	6169020199	N	96	2400
110231	1	1	09/16/91	3	12918	SG	ANAITIDES MUCOSA	5001130104	N	1	25
110231	1	1	09/16/91	3	12918	SG	ANAITIDES SP.	5001130199	N	1	25
110231	1	1	09/16/91	3	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	2	50
110231	1	1	09/16/91	3	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	1	25
110231	1	1	09/16/91	3	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110231	1	1	09/16/91	3	12918	SG	CIRRATULIDAE	5001500000	N	22	550
110231	1	1	09/16/91	3	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110231	1	1	09/16/91	3	12918	SG	COROPHIUM INSIDIOSUM	6169150211	N	2	50
110231	1	1	09/16/91	3	12918	SG	COROPHIUM SP.	6169150299	N	1	25
110231	1	1	09/16/91	3	12918	SG	ETEONE LONGA	5001130205	N	1	25
110231	1	1	09/16/91	3	12918	SG	GASTROPODA	51	N	1	25
110231	1	1	09/16/91	3	12918	SG	LEITOSCOLOPLOS SP.	5001400399	N	1	25
110231	1	1	09/16/91	3	12918	SG	LEPTOCHEIRUS PINGUIS	6169060702	N	2	50
110231	1	1	09/16/91	3	12918	SG	LEPTOCHEIRUS SP.	6169060799	N	2	50
110231	1	1	09/16/91	3	12918	SG	LYONSIA HYALINA	5520050206	N	1	25
110231	1	1	09/16/91	3	12918	SG	LYONSIA SP.	5520050299	N	2	50
110231	1	1	09/16/91	3	12918	SG	MEDIOMASTUS SP.	5001600499	N	3	75
110231	1	1	09/16/91	3	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110231	1	1	09/16/91	3	12918	SG	MYTILIDAE	5507010000	N	19	475
110231	1	1	09/16/91	3	12918	SG	NEPHTYIDAE	5001250000	N	28	700

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110231	1	1	09/16/91	3	12918	SG	NEREIDAE	500124	N	1	25
110231	1	1	09/16/91	3	12918	SG	NINOE NIGRIPES	5001310204	N	14	350
110231	1	1	09/16/91	3	12918	SG	OLIGOCHAETA	5004000000	N	618	15450
110231	1	1	09/16/91	3	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110231	1	1	09/16/91	3	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	2	50
110231	1	1	09/16/91	3	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110231	1	1	09/16/91	3	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110231	1	1	09/16/91	3	12918	SG	PYGOSPIO ELEGANS	5001431302	N	62	1550
110231	1	1	09/16/91	3	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110231	1	1	09/16/91	3	12918	SG	SCOLETOMA HEBES	5001319898	N	11	275
110231	1	1	09/16/91	3	12918	SG	SCOLETOMA SP.	5001319899	N	10	250
110231	1	1	09/16/91	3	12918	SG	SPIONIDAE	500143	N	5	125
110231	1	1	09/16/91	3	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	92	2300
110231	2	2	09/16/91	3	12918	SG	AMPELISCA ABDITA	6169020108	N	1	25
110231	2	2	09/16/91	3	12918	SG	ANAITIDES SP.	5001130199	N	2	50
110231	2	2	09/16/91	3	12918	SG	ARICIDEA (ACMIRA) CATHERINAE	5001410208	N	3	75
110231	2	2	09/16/91	3	12918	SG	ARICIDEA (ACMIRA) SP.	5001410299	N	6	150
110231	2	2	09/16/91	3	12918	SG	BIVALVIA	55	N	1	25
110231	2	2	09/16/91	3	12918	SG	CAPITELLA CAPITATA	5001600101	N	7	175
110231	2	2	09/16/91	3	12918	SG	CIRRATULIDAE	5001500000	N	17	425
110231	2	2	09/16/91	3	12918	SG	COROPHIUM ACHERUSICUM	6169150201	N	1	25
110231	2	2	09/16/91	3	12918	SG	DEXAMINE THEA	6169170401	N	3	75
110231	2	2	09/16/91	3	12918	SG	DODECACERIA SP.	5001500599	N	3	75
110231	2	2	09/16/91	3	12918	SG	EDWARDSIA ELEGANS	3759010101	N	1	25
110231	2	2	09/16/91	3	12918	SG	ETEONE SP.	5001130299	N	2	50
110231	2	2	09/16/91	3	12918	SG	GASTROPODA	51	N	29	725
110231	2	2	09/16/91	3	12918	SG	HIATELLA SP.	5517060299	N	1	25
110231	2	2	09/16/91	3	12918	SG	IDOTEA PHOSPHOREA	6162020309	N	1	25
110231	2	2	09/16/91	3	12918	SG	LEUCON AMERICANUS	6154040110	N	1	25
110231	2	2	09/16/91	3	12918	SG	LITTORINA LITTOREA	5103100108	N	2	50
110231	2	2	09/16/91	3	12918	SG	MEDIOMASTUS SP.	5001600499	N	13	325
110231	2	2	09/16/91	3	12918	SG	MICRODEUTOPUS GRYLLOTALPA	6169060401	N	2	50
110231	2	2	09/16/91	3	12918	SG	MICRODEUTOPUS SP.	6169060499	N	2	50
110231	2	2	09/16/91	3	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	1	25
110231	2	2	09/16/91	3	12918	SG	MYTILIDAE	5507010000	N	224	5600
110231	2	2	09/16/91	3	12918	SG	NEPHTYIDAE	5001250000	N	7	175
110231	2	2	09/16/91	3	12918	SG	NEPHTYS CILIATA	5001250102	N	2	50
110231	2	2	09/16/91	3	12918	SG	NEREIDAE	500124	N	1	25
110231	2	2	09/16/91	3	12918	SG	NINOE NIGRIPES	5001310204	N	19	475
110231	2	2	09/16/91	3	12918	SG	OLIGOCHAETA	5004000000	N	515	12875
110231	2	2	09/16/91	3	12918	SG	PAGURUS SP.	6183060299	N	1	25
110231	2	2	09/16/91	3	12918	SG	PHOLOE MINUTA	5001060101	N	12	300
110231	2	2	09/16/91	3	12918	SG	PHOXOCEPHALUS HOLBOLLI	6169420702	N	5	125
110231	2	2	09/16/91	3	12918	SG	POLYDORA CORNUTA	5001430498	N	1	25
110231	2	2	09/16/91	3	12918	SG	PRIONOSPIO SP.	5001430599	N	3	75
110231	2	2	09/16/91	3	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	1	25
110231	2	2	09/16/91	3	12918	SG	PYGOSPIO ELEGANS	5001431302	N	3	75
110231	2	2	09/16/91	3	12918	SG	RHYNCHOCOELA	4300000000	N	2	50
110231	2	2	09/16/91	3	12918	SG	SCOLETOMA HEBES	5001319898	N	15	375
110231	2	2	09/16/91	3	12918	SG	SCOLETOMA SP.	5001319899	N	46	1150
110231	2	2	09/16/91	3	12918	SG	SPIONIDAE	500143	N	1	25
110231	2	2	09/16/91	3	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	86	2150
110231	2	2	09/16/91	3	12918	SG	TELLINA AGILIS	5515310205	N	23	575
110231	2	2	09/16/91	3	12918	SG	TONICELLA RUBRA	5303020604	N	1	25
110231	3	3	09/16/91	3	12918	SG	AGLAOPHAMUS NEOTENUS	5001250305	N	1	25
110231	3	3	09/16/91	3	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110231	3	3	09/16/91	3	12918	SG	CIRRATULIDAE	5001500000	N	5	125
110231	3	3	09/16/91	3	12918	SG	ETEONE SP.	5001130299	N	1	25
110231	3	3	09/16/91	3	12918	SG	GASTROPODA	51	N	3	75
110231	3	3	09/16/91	3	12918	SG	MEDIOMASTUS SP.	5001600499	N	2	50
110231	3	3	09/16/91	3	12918	SG	MYTILIDAE	5507010000	N	38	950
110231	3	3	09/16/91	3	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110231	3	3	09/16/91	3	12918	SG	NINOE NIGRIPES	5001310204	N	4	100
110231	3	3	09/16/91	3	12918	SG	OLIGOCHAETA	5004000000	N	66	1650
110231	3	3	09/16/91	3	12918	SG	SCOLETOMA HEBES	5001319898	N	1	25
110231	3	3	09/16/91	3	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	13	325
110231	3	3	09/16/91	3	12918	SG	TELLINA AGILIS	5515310205	N	6	150
110231	4	4	09/16/91	3	12918	SG	ACMAEA TESTUDINALIS	5102050108	N	2	50
110231	4	4	09/16/91	3	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110231	4	4	09/16/91	3	12918	SG	CAPITELLA CAPITATA	5001600101	N	4	100
110231	4	4	09/16/91	3	12918	SG	CIRRATULIDAE	5001500000	N	60	1500
110231	4	4	09/16/91	3	12918	SG	CUMACEA	6154	N	1	25
110231	4	4	09/16/91	3	12918	SG	GASTROPODA	51	N	4	100
110231	4	4	09/16/91	3	12918	SG	HIPPOTHOA HYALINA	7816020101	C		
110231	4	4	09/16/91	3	12918	SG	LACUNA VINCTA	5103090305	N	3	75
110231	4	4	09/16/91	3	12918	SG	LITTORINA LITTOREA	5103100108	N	7	175
110231	4	4	09/16/91	3	12918	SG	MEDIOMASTUS SP.	5001600499	N	5	125
110231	4	4	09/16/91	3	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	2	50
110231	4	4	09/16/91	3	12918	SG	MYTILIDAE	5507010000	N	30	750
110231	4	4	09/16/91	3	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110231	4	4	09/16/91	3	12918	SG	NEPHTYIDAE	5001250000	N	3	75
110231	4	4	09/16/91	3	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110231	4	4	09/16/91	3	12918	SG	OLIGOCHAETA	5004000000	N	154	3850
110231	4	4	09/16/91	3	12918	SG	PHOLOE MINUTA	5001060101	N	2	50
110231	4	4	09/16/91	3	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110231	4	4	09/16/91	3	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	2	50
110231	4	4	09/16/91	3	12918	SG	PYGOSPIO ELEGANS	5001431302	N	12	300

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EPAID	REP	GRAB	DATE	STA	NAIID	SAMP	SPECIES	SPECODE	TYPE	NUM	DENS
110231	4	4	09/16/91	3	12918	SG	SCOLETOMA HEBES	5001319898	N	2	50
110231	4	4	09/16/91	3	12918	SG	SCOLETOMA SP.	5001319899	N	2	50
110231	4	4	09/16/91	3	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	252	6300
110231	4	4	09/16/91	3	12918	SG	TELLINA AGILIS	5515310205	N	3	75
110232	1	1	09/17/91	5	12918	SG	AMPELISCA ABDITA	6169020108	N	2	50
110232	1	1	09/17/91	5	12918	SG	AMPELISCA SP.	6169020199	N	1	25
110232	1	1	09/17/91	5	12918	SG	CAPITELLA CAPITATA	5001600101	N	1	25
110232	1	1	09/17/91	5	12918	SG	CIRRATULIDAE	5001500000	N	11	275
110232	1	1	09/17/91	5	12918	SG	ETEONE SP.	5001130299	N	1	25
110232	1	1	09/17/91	5	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	16	400
110232	1	1	09/17/91	5	12918	SG	NEPHTYIDAE	5001250000	N	324	8100
110232	1	1	09/17/91	5	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110232	1	1	09/17/91	5	12918	SG	NINOE NIGRIPES	5001310204	N	2	50
110232	1	1	09/17/91	5	12918	SG	OLIGOCHAETA	5004000000	N	29	725
110232	1	1	09/17/91	5	12918	SG	PRIONOSPIO SP.	5001430599	N	2	50
110232	1	1	09/17/91	5	12918	SG	PYGOSPIO ELEGANS	5001431302	N	2	50
110232	1	1	09/17/91	5	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110232	2	2	09/17/91	5	12918	SG	AMPELISCA ABDITA	6169020108	N	6	150
110232	2	2	09/17/91	5	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110232	2	2	09/17/91	5	12918	SG	CAPITELLA CAPITATA	5001600101	N	2	50
110232	2	2	09/17/91	5	12918	SG	CIRRATULIDAE	5001500000	N	34	850
110232	2	2	09/17/91	5	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110232	2	2	09/17/91	5	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	9	225
110232	2	2	09/17/91	5	12918	SG	NASSARIUS TRIVITTATUS	5105080103	N	1	25
110232	2	2	09/17/91	5	12918	SG	NEPHTYIDAE	5001250000	N	495	12375
110232	2	2	09/17/91	5	12918	SG	NINOE NIGRIPES	5001310204	N	1	25
110232	2	2	09/17/91	5	12918	SG	OLIGOCHAETA	5004000000	N	95	2375
110232	2	2	09/17/91	5	12918	SG	PRIONOSPIO SP.	5001430599	N	3	75
110232	2	2	09/17/91	5	12918	SG	RHYNCHOCOELA	4300000000	N	3	75
110232	2	2	09/17/91	5	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	1	25
110232	3	3	09/17/91	5	12918	SG	AMPELISCA ABDITA	6169020108	N	7	175
110232	3	3	09/17/91	5	12918	SG	AMPELISCA SP.	6169020199	N	2	50
110232	3	3	09/17/91	5	12918	SG	CAPITELLA CAPITATA	5001600101	N	4	100
110232	3	3	09/17/91	5	12918	SG	CIRRATULIDAE	5001500000	N	77	1925
110232	3	3	09/17/91	5	12918	SG	ETEONE LONGA	5001130205	N	1	25
110232	3	3	09/17/91	5	12918	SG	MEDIOMASTUS SP.	5001600499	N	1	25
110232	3	3	09/17/91	5	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	5	125
110232	3	3	09/17/91	5	12918	SG	MYTILIDAE	5507010000	N	3	75
110232	3	3	09/17/91	5	12918	SG	NEANTHES VIRENS	5001240302	N	1	25
110232	3	3	09/17/91	5	12918	SG	NEPHTYIDAE	5001250000	N	485	12125
110232	3	3	09/17/91	5	12918	SG	OLIGOCHAETA	5004000000	N	199	4975
110232	3	3	09/17/91	5	12918	SG	OXYUROSTYLIS SMITHI	6154050801	N	1	25
110232	3	3	09/17/91	5	12918	SG	PHOLOEMINUTA	5001060101	N	1	25
110232	3	3	09/17/91	5	12918	SG	PRIONOSPIO SP.	5001430599	N	12	300
110232	3	3	09/17/91	5	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	5	125
110232	3	3	09/17/91	5	12918	SG	RHYNCHOCOELA	4300000000	N	5	125
110232	3	3	09/17/91	5	12918	SG	SCOLETOMA HEBES	5001319898	N	2	50
110232	3	3	09/17/91	5	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	3	75
110232	4	4	09/17/91	5	12918	SG	AMPELISCA ABDITA	6169020108	N	26	650
110232	4	4	09/17/91	5	12918	SG	AMPELISCA SP.	6169020199	N	6	150
110232	4	4	09/17/91	5	12918	SG	ANAITIDES MUCOSA	5001130104	N	1	25
110232	4	4	09/17/91	5	12918	SG	CAPITELLA CAPITATA	5001600101	N	7	175
110232	4	4	09/17/91	5	12918	SG	CIRRATULIDAE	5001500000	N	34	850
110232	4	4	09/17/91	5	12918	SG	MICROPHTHALMUS ABERRANS	5001210202	N	4	100
110232	4	4	09/17/91	5	12918	SG	MYTILIDAE	5507010000	N	7	175
110232	4	4	09/17/91	5	12918	SG	NEPHTYIDAE	5001250000	N	309	7725
110232	4	4	09/17/91	5	12918	SG	NEPHTYS INCISA	5001250115	N	1	25
110232	4	4	09/17/91	5	12918	SG	OLIGOCHAETA	5004000000	N	203	5075
110232	4	4	09/17/91	5	12918	SG	PRIONOSPIO SP.	5001430599	N	5	125
110232	4	4	09/17/91	5	12918	SG	PRIONOSPIO STEENSTRUPI	5001430506	N	6	150
110232	4	4	09/17/91	5	12918	SG	RHYNCHOCOELA	4300000000	N	1	25
110232	4	4	09/17/91	5	12918	SG	STREBLOSPIO BENEDICTI	5001431801	N	13	325

Appendix L
CHEMICAL CONTAMINATION IN MARINE SEDIMENTS, TISSUES, AND WATER SAMPLES

ALL CATEGORIES: VARIABLE LISTS BEGIN

VARIABLE	DESCRIPTION
EPAID	EPA ID (Chain of Custody ID number).
REP	Replicate identification.
DUP	Duplicate sample identification within a replicate.
CDATE	Collection date expressed as YYMMDD (from CUSTODY database).
CTIME	Collection time (from CUSTODY database).
STA	University of New Hampshire station identifier (from CUSTODY database).

For sections XII. (A) VOC, (B) PAH, (C) PCB and (D) PESTICIDE, the variable EPAID is in the form <EPAID><REP><DUP>.

1. VOLATILE ORGANIC COMPOUNDS

VARIABLE	DESCRIPTION
BENZENE	Benzene
BROMODICH	Bromodichloromethane
BROMOFORM	Bromoform
CARBONTET	Carbon tetrachloride
CHLOROBEN	Chlorobenzene
CLETHVINE	2-Chloroethylvinyl ether
CHLOROFOR	Chloroform
CL2BEN12	1,2-Dichlorobenzene
CL2BEN13	1,3-Dichlorobenzene
CL2ETH12	1,2-Dichloroethane
CL2ETH11	1,1-Dichloroethane
CL2ETHE12	Trans-1,2-dichloroethene
CL2PROP12	1,2-Dichloropropane
CL2PROPEC	Cis-1,3-dichloropropene
CL2PROPET	Trans-1,3-dichloropropene
ETHYLBEN	Ethyl benzene
METHYLT	Methyl-t-butyl ether
METHYLENE	Methylene chloride
CL4ETHANE	1,1,2,2-Tetrachloroethane
TETRACHLO	Tetrachloroethene
TOLUENE	Toluene
CL3ETH111	1,1,1-Trichloroethane
CL3ETH	Trichloroethene
VINYLCH	Vinyl chloride
MPXYLENE	m,p-Xylene
OXYLENE	o-Xylene
SUM	Sum of concentrations.

HALOGENATED AND AROMATIC VOLATILE ORGANICS (ug/L)

EPAID	112327A1	112326A1	112325A1	112325B1	112325B2
CDATE CTIME	920213 12:15	920213 12:20	920213 12:30	920213 12:30	920213 12:30
STA	S3	S2	S1	S1	S1
compound					
BENZENE	0.60	0.60	0.60	0.60	0.60
BROMODICH	0.60	0.60	0.60	0.60	0.60
BROMOFORM	0.60	0.60	0.60	0.60	0.60
CARBONTET	0.60	0.60	0.60	0.60	0.60
CHLOROBEN	0.60	0.60	0.60	0.60	0.60
CLETHVINE	0.60	0.60	0.60	0.60	0.60
CHLOROFOR	0.60	0.60	0.60	0.60	0.60
CL2BEN12	0.60	0.60	0.60	0.60	0.60
CL2BEN13	0.60	0.60	0.60	0.60	0.60
CL2ETH12	0.60	0.60	0.70	0.60	0.60
CL2ETH11	0.60	0.60	0.60	0.60	0.60
CL2ETHE12	0.60	0.60	0.60	0.60	0.60
CL2PROP12	0.60	0.60	0.60	0.60	0.60
CL2PROPEC	0.60	0.60	0.60	0.60	0.60
CL2PROPET	0.60	0.60	0.60	0.60	0.60
ETHYLBEN	0.60	0.60	0.60	0.60	0.60
METHYLT	0.60	0.60	0.60	0.60	0.60
METHYLENE	2.80	2.60	3.20	3.50	4.30
CL4ETHANE	0.60	0.60	0.60	0.60	0.60
TETRACHLO	0.60	0.60	0.60	0.60	0.60
TOLUENE	0.60	0.60	0.60	0.60	0.60
CL3ETH111	0.60	0.60	0.60	0.60	0.60
CL3ETH	0.60	0.60	0.60	0.60	0.60
VINYLCH	0.60	0.60	1.30	1.10	1.10
MPXYLENE	0.60	0.60	0.60	0.60	0.60
OXYLENE	0.60	0.60	0.60	0.60	0.60
SUM	17.80	17.6	19.0	19.1	19.80

2. POLYCYCLIC AROMATIC HYDROCARBONS

VARIABLE	DESCRIPTION	VARIABLE	DESCRIPTION
%H_2O	Percent moisture	%H_2O	Percent moisture
FLRENE	Fluorene	CHRY	Chrysene
PHEN	Phenanthrene	SUMBENZ	Sum of benzofluoranthenes
ANTH	Anthracene		
C1	C1-phenanthrene + anthracene	BEP	Benzo(e)pyrene
		BAP	Benzo(a)pyrene
C2	C2-phenanthrene + anthracene	PYRYLEN	Perylene
		INDEN123	Indeno(1,2,3-cd)pyrene
C3	C3-phenanthrene + anthracene	DIBAHA	Dibenz(a,h)anthracene
		BGHIPER	Benzo(g,h,i)perylene
C4	C4-phenanthrene + anthracene	SUM	Sum of PAHs
FLUORAN	Fluoranthene		
PYRENE	Pyrene		
BAA	Benz(a)anthracene		

DATA QUALIFIER CODES:

- a Analyte was not detected below the method detection limit (MDL) shown.
- b Reported value was below the limit of quantification (LOQ).
- c Not reported due to matrix interference.
- d Not quantified.
- e Not reported.
- f Reported value was below the MDL.
- h Quantification was based on alternate internal standard.
- j Analysis was performed with selected ion monitoring.
- p Value shown may be biased because recovery of the analyte in reference material was outside the desired range.
- u Analyte was not detected at the instrument detection limit.

POLYCYCLIC AROMATIC HYDROCARBON DATA (ppb) and DATA FLAGS

EPAID	CDATE	CTIME	STA	%H_2O	FLRENE	PHEN	ANTH	C1	C2	C3	C4	FLUORAN	PYRENE	BAA
(A) EELGRASS LEAVES														
110042A1	910916	13:30	3	15.0	10.00 a	11.00 b	20.00 a	20.00 a	20.00 a	20.00 a	20.00 a	25.00 b	26.00 b	20.00 a
110042A2	910916	13:30	3	15.0	10.00 a	10.00 a	20.00 a	20.00 a	20.00 a	20.00 a	20.00 a	18.00 b	18.00 b	20.00 a
110044A1	910917	14:30	19	10.0	10.00 a	12.00 b	20.00 a	20.00 a	29.00 b	20.00 a	20.00 a	34.00 b	44.00 b	20.00 a
110053A1	911022	16:30	12A	10.0	4.10 f	21.00 b	3.70 f	27.00 b	52.00 b	16.00 f	22.00 a	60.00	49.00	12.00 f
110053A2	911022	16:30	12A	10.0	2.60 f	27.00 b	4.90 f	40.00 b	50.00 b	17.50 f	22.00 a	57.00	49.00	10.60 f
(B) EELGRASS ROOTS														
110042C1	910916	13:30	3	12.0	10.00 a	22.00 b	20.00 a	55.00 b	72.00	30.00 b	20.00 a	79.00	79.00	40.00 b
110044C1	910917	14:30	19	10.0	10.00 a	20.00 b	20.00 a	20.00 a	45.00 b	20.00 a	20.00 a	76.00	90.00	68.00
(C) FLOUNDER FLESH														
110182A1	910925	08:45	T7	75.0	40.00 a	14.00 f	80.00 a	29.00 f	38.00 f	14.00 f	80.00 a	11.00 f	10.00 f	80.00 a
110181A1	910925	13:50	T5	77.0	11.00 a	11.00 a	22.00 a	22.00 a	22.00 a	22.00 a	22.00 a	16.00 a	16.00 a	22.00 a
110187A1	910926	12:36	T8	80.0	12.00 a	12.00 a	25.00 a	25.00 a	25.00 a	25.00 a	25.00 a	19.00 a	19.00 a	25.00 a
(D) FLOUNDER LIVER														
110181B1	910925	13:50	T5	80.0	32.00 a	14.60 f	15.60 f	64.00 a	64.00 a	64.00 a	64.00 a	16.20 f	8.00 f	64.00 a
110187B1	910926	12:36	T8	80.0	2.00 f	8.40 f	32.00 a	5.40 f	32.00 a	32.00 a	32.00 a	2.60 f	3.00 f	32.00 a
(E) FUCOID														
110143A1	910916	14:30	19	11.0	1.00 f	5.00 f	20.00 a	13.00 f	20.00 a	20.00 a	20.00 a	15.00 c	3.00 f	1.00 f
110145A1	910918	13:00	8	15.0	10.00 a	4.00 f	20.00 a	12.00 f	20.00 a	4.00 f	20.00 a	15.00 c	4.00 f	2.00 f
110145A2	910918	13:00	8	15.0	10.00 a	10.00 a	20.00 a	20.00 a	20.00 a	20.00 a	20.00 a	15.00 a	15.00 a	20.00 a
110146A1	910918	13:30	10	14.0	10.00 a	3.00 f	20.00 a	10.00 f	20.00 a	5.00 f	20.00 a	15.00 c	3.00 f	20.00 a
110149A1	910927	09:30	10A	16.0	10.00 a	10.00 a	20.00 a	20.00 a	20.00 a	20.00 a	20.00 a	15.00 c	15.00 a	20.00 a
(F) LOBSTER HEPATOPANCREAS														
110152B1	910925	08:45	T7	54.0	22.00 b	86.00	22.00 f	210.00	350.00	160.00	40.00 a	520.00	460.00	71.00 b
110151B1	910925	13:50	T5	51.0	23.00 b	310.00	81.00	440.00	440.00	180.00	40.00 a	1400.00	1200.00	380.00
110157B1	910926	12:36	T8	79.0	30.00 b	230.00	69.00 b	260.00	290.00	24.00 a	24.00 a	580.00	400.00	65.00 b
(G) LOBSTER TAIL FLESH														
110150A1	910923	09:10	T2	53.0	5.00 f	46.00	9.00 f	190.00	180.00	87.00	20.00 a	300.00	240.00	76.00
110153A1	910925	08:00	T4	66.0	29.00 b	120.00	17.00 f	180.00	220.00	120.00	20.00 a	410.00	310.00	59.00
110152A1	910925	08:45	T7	79.0	12.00 a	12.00 a	24.00 a	24.00 a	24.00 a	24.00 a	24.00 a	18.00 a	18.00 a	24.00 a
110154A1	910925	10:10	T9	73.0	42.00	490.00	80.00	670.00	710.00	320.00	20.00 a	1300.00	1200.00	220.00
110151A1	910925	13:50	T5	78.0	11.00 a	11.00 a	22.00 a	22.00 a	22.00 a	22.00 a	22.00 a	17.00 a	17.00 a	22.00 a

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	CHRYS	SUMBENZ	BEP	BAP	PERYLEN	INDEN123	DIBAHA	BGHIPER	SUM
(A) EELGRASS LEAVES													
110042A1	910916	13:30	3	15.0	20.00 a	40.00 a	22.00 b	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	354.00
110042A2	910916	13:30	3	15.0	20.00 a	40.00 a	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	15.00 a	331.00
110044A1	910917	14:30	19	10.0	20.00 a	43.00 b	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	392.00
110053A1	911022	16:30	12A	10.0	20.00 f	34.00 f	17.00 f	11.00 f	5.50 f	3.20 f	5.20 f	5.10 f	367.80
110053A2	911022	16:30	12A	10.0	27.00 b	23.00 f	14.00 f	8.90 f	3.70 f	4.50 f	16.00 a	7.00 f	384.70
(B) EELGRASS ROOTS													
110042C1	910916	13:30	3	12.0	36.00 b	130.00	43.00 b	63.00	26.00 b	27.00 b	15.00 a	28.00 b	795.00
110044C1	910917	14:30	19	10.0	23.00 b	170.00	55.00	87.00	33.00 b	44.00 b	15.00 a	41.00 b	857.00
(C) FLOUNDER FLESH													
110182A1	910925	08:45	T7	75.0	80.00 a	160.00 a	80.00 a	60.00 a	60.00 a	60.00 a	60.00 a	80.00 a	1036.00
110181A1	910925	13:50	T5	77.0	22.00 a	44.00 a	22.00 a	16.00 a	16.00 a	16.00 a	16.00 a	22.00 a	360.00
110187A1	910926	12:36	T8	80.0	25.00 a	50.00 a	25.00 a	19.00 a	19.00 a	19.00 a	19.00 a	25.00 a	413.00
(D) FLOUNDER LIVER													
110181B1	910925	13:50	T5	80.0	64.00 a	3.60 f	7.00 f	2.40 f	48.00 a	48.00 a	48.00 a	64.00 a	691.40
110187B1	910926	12:36	T8	80.0	32.00 a	64.00 a	32.00 a	24.00 a	24.00 a	24.00 a	24.00 a	32.00 a	437.40
(E) FUCOID													
110143A1	910916	14:30	19	11.0	20.00 a	2.00 f	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	240.00
110145A1	910918	13:00	8	15.0	2.00 f	2.00 f	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	215.00
110145A2	910918	13:00	8	15.0	20.00 a	40.00 a	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	330.00
110146A1	910918	13:30	10	14.0	1.00 f	40.00 a	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	267.00
110149A1	910927	09:30	10A	16.0	20.00 a	40.00 a	20.00 a	15.00 a	15.00 a	15.00 a	15.00 a	20.00 a	330.00
(F) LOBSTER HEPATOPANCREAS													
110152B1	910925	08:45	T7	54.0	190.00	240.00	180.00	92.00 b	48.00 b	48.00 b	30.00 a	67.00 b	2836.00
110151B1	910925	13:50	T5	51.0	480.00	940.00	500.00	460.00	160.00	280.00	30.00 a	310.00	7654.00
110157B1	910926	12:36	T8	79.0	86.00	400.00	180.00	190.00	63.00	45.00 b	14.00 a	30.00 b	2980.00
(G) LOBSTER TAIL FLESH													
110150A1	910923	09:10	T2	53.0	110.00	180.00	100.00	80.00	43.00	26.00 b	15.00 a	24.00 b	1731.00
110153A1	910925	08:00	T4	66.0	140.00	200.00	140.00	77.00	53.00	25.00 b	15.00 a	28.00 b	2163.00
110152A1	910925	08:45	T7	79.0	24.00 a	48.00 a	24.00 a	18.00 a	18.00 a	18.00 a	18.00 a	24.00 a	396.00
110154A1	910925	10:10	T9	73.0	370.00	550.00	230.00	250.00	93.00	78.00	15.00 a	58.00 b	6696.00
110151A1	910925	13:50	T5	78.0	22.00 a	44.00 a	22.00 a	17.00 a	17.00 a	17.00 a	17.00 a	22.00 a	366.00

(Contd)

EPAID	CDATE	CTIME	STA	%H₂O	FLRENE	PHEN	ANTH	C1	C2	C3	C4	FLUORAN	PYRENE	BAA
(G) LOBSTER TAIL FLESH (cont)														
110156A1	910926	08:50	T3	47.0	130.00	600.00	170.00	620.00	520.00	180.00	20.00 a	1600.00	1200.00	300.00
110156A2	910926	08:50	T3	47.0	130.00	660.00	140.00	700.00	620.00	280.00	20.00 a	1600.00	1400.00	290.00
110155A1	910926	10:32	T6	58.0	48.00	130.00	37.00 b	230.00	260.00	20.00 a	20.00 a	480.00	490.00	88.00
110157A1	910926	12:36	T8	79.0	1.00 f	12.00 b	3.00 f	16.00 f	15.00 f	4.00 f	24.00 a	40.00 b	27.00 b	4.00 f
110157A2	910926	12:36	T8	79.0	2.00 f	14.00 b	4.00 f	19.00 f	17.00 f	5.00 f	24.00 a	49.00 b	33.00 b	6.00 f
(H) MUSSELS														
110061A1	910910	08:00	28	87.0	19.00 a	14.00 f	7.00 f	32.00 f	100.00 b	65.00 b	20.00 f	74.00 b	120.00	41.00 b
110070A1	910912	07:30	17	88.0	20.00 a	29.00 b	7.00 f	44.00 b	93.00 b	72.00 b	41.00 a	90.00	100.00	34.00 f
110071A1	910912	08:00	20	88.0	21.00 a	23.00 b	4.00 f	51.00 b	85.00 b	75.00 b	18.00 f	58.00 b	72.00 b	25.00 f
110072A1	910912	08:25	21	86.0	35.00 a	24.00 f	71.00 a	25.00 f	85.00 b	71.00 a	71.00 a	81.00 b	99.00 b	34.00 f
110073A1	910916	12:00	1	88.0	21.00 a	10.00 f	4.00 f	28.00 f	67.00 b	58.00 b	42.00 a	51.00 b	56.00 b	18.00 f
110074A1	910916	12:45	14	88.0	4.00 f	12.00 f	5.00 f	31.00 f	35.00 f	37.00 f	42.00 a	53.00 b	58.00 b	29.00 f
110062A1	910920	17:20	27	89.0	23.00 a	20.00 f	6.00 f	56.00 b	100.00 b	76.00 b	45.00 a	67.00 b	88.00 b	37.00 f
110076A1	910923	07:15	11	87.0	14.00 f	22.00 b	6.00 f	75.00 b	114.00	100.00 b	38.00 a	79.00 b	82.00 b	26.00 f
110077A1	910923	08:00	16	86.0	17.00 a	13.00 f	5.00 f	70.00 b	130.00	80.00 b	25.00 f	62.00 b	87.00	36.00 b
110077A2	910923	08:00	16	86.0	18.00 a	14.00 f	8.00 f	35.00 f	120.00	77.00 b	21.00 f	64.00 b	84.00	32.00 f
110078A1	910927	07:45	19	94.5	14.00 f	38.00 b	12.00 f	68.00 f	92.00 b	72.00 a	72.00 a	100.00 b	100.00 b	27.00 f
110078A2	910927	07:45	19	94.5	7.00 f	42.00 b	8.00 f	96.00 b	100.00 b	72.00 a	72.00 a	87.00 b	85.00 b	20.00 f
110079A1	910927	08:15	10A	88.0	3.00 f	18.00 f	4.00 f	28.00 f	37.00 f	41.00 a	41.00 a	75.00 b	71.00 b	30.00 f
110080A1	910930	09:40	3	92.1	5.00 f	22.00 f	5.00 f	37.00 f	77.00 b	50.00 a	50.00 a	46.00 b	69.00 b	23.00 f
110081A1	910930	10:20	5	87.0	19.00 a	21.00 b	4.00 f	36.00 f	38.00 a	66.00 b	52.00 b	59.00 b	66.00 b	25.00 f
110082A1	910930	10:55	7	85.0	16.00 a	24.00 b	8.00 f	34.00 b	57.00 b	140.00	33.00 a	110.00	110.00	30.00 f
110083A1	910930	11:30	8	85.0	32.00 a	35.00 b	10.00 f	54.00 f	64.00 a	160.00 b	92.00 b	180.00	160.00	39.00 f
110063A1	910930	13:00	25	89.0	23.00 a	15.00 f	5.00 f	46.00 b	140.00	79.00 b	45.00 a	83.00 b	100.00 b	44.00 f
110075B1	911001	11:45	2	87.0	13.00 f	67.00	12.00 f	74.00 b	130.00	72.00 b	38.00 a	170.00	160.00	57.00 b
110064A1	911001	12:45	24	89.0	8.00 f	38.00 b	14.00 f	70.00 b	140.00	120.00 b	45.00 a	130.00	150.00	71.00 b
110085A1	911003	12:05	6	86.0	18.00 a	29.00 b	8.00 f	46.00 b	88.00 b	45.00 b	36.00 a	100.00	97.00	43.00 b
110086A1	911003	13:00	4	87.0	19.00 a	17.00 f	10.00 f	48.00 b	38.00 a	72.00 b	38.00 a	74.00 b	80.00 b	32.00 f
110087A1	911003	13:30	18	85.0	16.00 a	19.00 b	5.00 f	42.00 b	61.00 b	91.00 b	32.00 a	99.00	93.00	28.00 f
110087A2	911003	13:30	18	85.0	12.00 f	26.00 b	10.00 f	50.00 b	53.00 b	70.00 b	32.00 a	87.00	84.00 b	27.00 f
110088A1	911004	07:58	22	85.0	12.00 f	43.00 b	10.00 f	37.00 b	33.00 a	33.00 a	33.00 a	47.00 b	38.00 b	9.00 f
110089A1	911004	09:24	23	85.0	6.00 f	29.00 b	8.00 f	29.00 f	36.00 b	79.00 b	33.00 a	45.00 b	33.00 b	33.00 a
110089A2	911004	09:24	23	85.0	5.00 f	20.00 b	5.00 f	26.00 f	29.00 f	68.00 b	33.00 a	47.00 b	35.00 b	10.00 f
110060C1	911010	08:50	26	90.0	25.00 a	18.00 f	10.00 f	68.00 b	280.00	190.00	50.00 b	180.00	350.00	120.00 b
110090A1	911022	15:00	10	89.0	18.00 a	43.00 b	13.00 f	67.00 b	180.00	100.00 b	36.00 a	58.00	74.00	24.00 f
110090A2	911022	15:00	10	89.0	6.80 f	45.00 b	8.60 f	64.00	160.00	120.00	36.00 a	74.00	82.00	22.00 f
110390A1	911217	07:30	1	91.0	28.00 a	24.00 f	10.00 f	86.00 b	69.00 b	56.00 a	56.00 a	58.00 b	52.00 b	20.00 f
110391A1	911217	09:30	12A	92.0	31.00 a	75.00 b	21.00 f	100.00 b	58.00 f	62.00 a	62.00 a	110.00 b	100.00 b	34.00 f

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	CHRYS		SUMBENZ		BEP		BAP		PERYLEN		INDEN123		DIBAHA		BGHIPER		SUM
(G) LOBSTER TAIL FLESH (cont)																					
110156A1	910926	08:50	T3	47.0	530.00		730.00		320.00		270.00		110.00		68.00		15.00	a	56.00	b	7439.00
110156A2	910926	08:50	T3	47.0	520.00		720.00		360.00		330.00		100.00		63.00		15.00	a	73.00		8021.00
110155A1	910926	10:32	T6	58.0	130.00		220.00		140.00		100.00		50.00		31.00	b	15.00	a	32.00	b	2521.00
110157A1	910926	12:36	T8	79.0	8.00	f	31.00	f	13.00	f	17.00	b	6.00	f	17.00	a	17.00	a	24.00	a	279.00
110157A2	910926	12:36	T8	79.0	11.00	f	38.00	f	19.00	f	21.00	b	9.00	f	4.00	f	17.00	a	7.00	f	299.00
(H) MUSSELS																					
110061A1	910910	08:00	28	87.0	56.00	b	170.00	b	93.00	b	39.00	b	64.00	b	29.00	a	29.00	a	38.00	a	1010.00
110070A1	910912	07:30	17	88.0	44.00	b	110.00	b	58.00	b	26.00	f	35.00	b	31.00	a	31.00	a	41.00	a	906.00
110071A1	910912	08:00	20	88.0	41.00	b	100.00	b	64.00	b	19.00	f	35.00	b	31.00	a	31.00	a	41.00	a	794.00
110072A1	910912	08:25	21	86.0	52.00	f	94.00	f	67.00	f	28.00	f	27.00	f	53.00	a	53.00	a	71.00	a	1041.00
110073A1	910916	12:00	1	88.0	27.00	f	67.00	f	37.00	f	12.00	f	22.00	f	9.00	f	31.00	a	10.00	f	570.00
110074A1	910916	12:45	14	88.0	40.00	f	85.00	b	49.00	b	23.00	f	27.00	f	31.00	a	31.00	a	42.00	a	634.00
110062A1	910920	17:20	27	89.0	50.00	b	90.00	a	85.00	b	42.00	b	46.00	b	34.00	a	34.00	a	34.00	a	933.00
110076A1	910923	07:15	11	87.0	41.00	b	96.00	b	53.00	b	23.00	f	25.00	f	29.00	a	29.00	a	38.00	a	890.00
110077A1	910923	08:00	16	86.0	51.00	b	110.00	b	60.00	b	29.00	b	32.00	b	26.00	a	26.00	a	35.00	a	894.00
110077A2	910923	08:00	16	86.0	43.00	b	100.00	b	47.00	b	19.00	f	26.00	f	27.00	a	27.00	a	36.00	a	798.00
110078A1	910927	07:45	19	94.5	46.00	f	104.00	f	72.00	b	22.00	f	54.00	a	3.00	f	54.00	a	5.00	f	955.00
110078A2	910927	07:45	19	94.5	40.00	f	80.00	f	58.00	b	20.00	f	54.00	a	54.00	a	54.00	a	72.00	a	1021.00
110079A1	910927	08:15	10A	88.0	31.00	f	54.00	b	37.00	f	16.00	f	23.00	f	31.00	a	31.00	a	41.00	a	612.00
110080A1	910930	09:40	3	92.1	33.00	f	96.00	b	54.00	b	18.00	f	21.00	f	7.00	f	38.00	a	10.00	f	661.00
110081A1	910930	10:20	5	87.0	38.00	b	88.00	b	42.00	b	18.00	f	28.00	a	28.00	a	28.00	a	38.00	a	694.00
110082A1	910930	10:55	7	85.0	60.00	b	110.00	b	65.00	b	19.00	f	16.00	f	24.00	a	24.00	a	33.00	a	913.00
110083A1	910930	11:30	8	85.0	61.00	f	110.00	f	88.00	b	30.00	f	48.00	a	48.00	a	48.00	a	64.00	a	1323.00
110063A1	910930	13:00	25	89.0	57.00	b	170.00	b	94.00	b	36.00	b	48.00	b	34.00	a	34.00	a	45.00	a	1098.00
110075B1	911001	11:45	2	87.0	70.00	b	130.00	b	59.00	b	30.00	b	31.00	b	29.00	a	29.00	a	38.00	a	1209.00
110064A1	911001	12:45	24	89.0	97.00	b	320.00		140.00		82.00	b	59.00	b	22.00	f	34.00	a	20.00	f	1560.00
110085A1	911003	12:05	6	86.0	53.00	b	100.00	b	57.00	b	21.00	f	28.00	b	9.00	f	27.00	a	36.00	a	841.00
110086A1	911003	13:00	4	87.0	46.00	b	87.00	b	61.00	b	23.00	f	19.00	f	28.00	a	28.00	a	38.00	a	758.00
110087A1	911003	13:30	18	85.0	48.00	b	91.00	b	53.00	b	17.00	f	23.00	f	24.00	a	24.00	a	32.00	a	798.00
110087A2	911003	13:30	18	85.0	47.00	b	64.00	a	49.00	b	21.00	f	35.00	b	24.00	a	24.00	a	32.00	a	747.00
110088A1	911004	07:58	22	85.0	13.00	f	17.00	f	19.00	f	18.00	f	25.00	a	25.00	a	25.00	a	33.00	a	470.00
110089A1	911004	09:24	23	85.0	15.00	f	66.00	a	33.00	a	25.00	a	25.00	a	25.00	a	25.00	a	33.00	a	578.00
110089A2	911004	09:24	23	85.0	16.00	f	66.00	a	17.00	f	17.00	f	25.00	a	25.00	a	25.00	a	33.00	a	502.00
110060C1	911010	08:50	26	90.0	160.00		530.00		280.00		120.00		110.00	b	37.00	a	37.00	a	49.00	a	2614.00
110090A1	911022	15:00	10	89.0	32.00	f	90.00	b	56.00	b	20.10	f	14.60	f	6.30	f	28.00	a	6.50	f	866.50
110090A2	911022	15:00	10	89.0	32.00	f	100.00	b	58.00	b	19.00	f	18.00	f	9.30	f	28.00	a	10.00	f	892.70
110390A1	911217	07:30	1	91.0	28.00	f	41.00	f	56.00	a	29.00	f	42.00	a	42.00	a	42.00	a	56.00	a	795.00
110391A1	911217	09:30	12A	92.0	55.00	f	65.00	f	23.00	f	9.00	f	47.00	a	47.00	a	47.00	a	62.00	a	1008.00

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	FLRENE	PHEN	ANTH	C1	C2	C3	C4	FLUORAN	PYRENE	BAA
(H) MUSSELS (cont)														
110392A1	911217	15:00	17	88.0	8.00 f	47.00 b	12.00 f	95.00 b	140.00	150.00	41.00 a	110.00	94.00	39.00 f
110393A1	911218	13:30	23	89.0	22.00 a	15.00 f	45.00 a	29.00 f	20.00 f	45.00 a	45.00 a	23.00 f	19.00 f	45.00 a
110394A1	911219	14:15	9	90.0	25.00 a	36.00 b	13.00 f	59.00 b	82.00 b	49.00 a	49.00 a	77.00 b	70.00 b	21.00 f
110395A1	911219	14:30	3	91.0	28.00 a	26.00 f	5.00 f	22.00 f	63.00 b	55.00 a	55.00 a	56.00 b	57.00 b	21.00 f
110396A1	911219	14:45	19	92.0	31.00 a	35.00 b	8.00 f	67.00 b	89.00 b	63.00 b	62.00 a	78.00 b	90.00 b	30.00 f
110396A2	911219	14:45	19	92.0	31.00 a	27.00 f	8.00 f	64.00 b	81.00 b	56.00 f	62.00 a	61.00 b	62.00 b	24.00 f
110397A1	911219	15:15	18	90.0	24.00 a	32.00 b	9.00 f	61.00 b	74.00 b	59.00 b	49.00 a	79.00 b	74.00 b	23.00 f
110398A1	920310	07:40	16	86.0	33.00 b	90.00	15.00 f	150.00	150.00	96.00 b	36.00 a	180.00	130.00	35.00 f
110399A1	920310	08:40	17	89.0	17.00 f	46.00 b	59.00 b	89.00 b	110.00 b	78.00 b	8.00 f	91.00 b	69.00 b	28.00 f
110400A1	920310	10:40	12A	88.0	30.00 b	62.00	18.00 f	91.00 b	100.00 b	70.00 b	15.00 f	130.00	96.00	37.00 f
110401A1	920317	12:40	1	88.0	11.00 f	110.00	33.00 f	130.00	98.00 b	50.00 b	6.00 f	120.00	120.00	48.00 b
110402A1	920318	14:40	9	87.0	4.00 f	30.00 b	39.00 b	50.00 b	55.00 b	35.00 f	38.00 a	61.00 b	44.00 b	18.00 f
110403A1	920318	15:08	3	88.0	4.00 f	27.00 b	5.00 f	47.00 b	61.00 b	42.00 b	41.00 a	52.00 b	41.00 b	14.00 f
110404A1	920318	15:35	19	88.0	4.00 f	33.00 b	43.00 b	55.00 b	60.00 b	38.00 f	42.00 a	62.00 b	46.00 b	18.00 f
110405A1	920318	16:19	18	88.0	5.00 f	42.00 b	10.00 f	75.00 b	100.00 b	67.00 b	41.00 a	86.00 b	72.00 b	24.00 f
110405A2	920318	16:19	18	88.0	21.00 a	21.00 a	42.00 a	42.00 a	42.00 a	42.00 a	42.00 a	69.00 b	39.00 b	42.00 a
110406A1	920318	16:19	23	87.0	6.00 f	22.00 b	28.00 f	29.00 f	22.00 f	17.00 f	38.00 a	37.00 b	15.00 f	3.00 f
(I) POST DEPLOYMENT MUSSELS														
798951A1	911023		2	84.0	8.00 f	32.00 b	7.00 f	45.00 b	120.00	160.00	31.00 a	61.00 b	74.00	27.00 f
798952A1	911023		2	83.0	6.00 f	28.00 b	5.00 f	53.00 b	97.00	54.00 b	29.00 a	77.00	78.00	25.00 f
798953A1	911023		2	85.0	9.00 f	54.00 b	9.00 f	56.00 b	120.00 b	82.00 b	44.00 a	87.00 b	120.00	32.00 f
798955A1	911023		8	84.0	15.00 a	11.00 f	31.00 a	45.00 b	31.00 a	31.00 a	31.00 a	38.00 b	56.00 b	13.00 f
798956A1	911023		8	82.0	14.00 a	7.00 f	27.00 a	27.00 a	27.00 a	27.00 a	27.00 a	35.00 b	39.00 b	12.00 f
798957A1	911023		8	84.0	5.00 f	12.00 f	5.00 f	22.00 f	30.00 a	66.00 b	30.00 a	30.00 b	38.00 b	11.00 f
798963A1	911023		15	85.0	4.00 f	13.00 f	4.00 f	51.00 b	170.00	100.00	33.00 a	35.00 b	61.00 b	20.00 f
798964A1	911023		15	81.0	3.00 f	10.00 f	4.00 f	35.00 b	130.00	93.00	26.00 a	30.00 b	47.00 b	20.00 f
798965A1	911023		15	84.0	4.00 f	13.00 f	8.00 f	18.00 f	160.00	130.00	30.00 a	43.00 b	54.00 b	23.00 f
798967A1	911023		19	82.0	4.00 f	11.00 f	3.00 f	22.00 f	77.00 b	48.00 b	27.00 a	28.00 b	39.00 b	13.00 f
798968A1	911023		19	83.0	3.00 f	11.00 f	4.00 f	19.00 f	67.00 b	34.00 b	29.00 a	24.00 b	33.00 b	10.00 f
(J) PRE DEPLOYMENT MUSSELS														
798971A1	911023		22	85.0	5.00 f	17.00 b	18.00 f	34.00 b	52.00 b	53.00 b	32.00 a	13.00 f	18.00 f	7.00 f
798972A1	911023		22	83.0	14.00 a	7.00 f	28.00 a	28.00 a	33.00 b	30.00 b	28.00 a	12.00 f	8.00 f	5.00 f
798973A1	911023		22	85.0	3.00 f	14.00 f	4.00 f	28.00 f	32.00 b	32.00 a	32.00 a	31.00 b	92.00	7.00 f
798973A2	911023		22	85.0	2.00 f	8.00 f	2.00 f	16.00 f	17.00 f	32.00 a	32.00 a	20.00 f	13.00 f	4.00 f
(K) SEDIMENT CORE														
110015A1	910916	10:40	15	47.0	40.00	360.00	170.00	420.00	410.00	240.00	34.00 b	930.00	810.00	480.00

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	CHRY		SUMBENZ		BEP		BAP		PERYLEN		INDEN123		DIBAHA		BGHIPER		SUM
(H) MUSSELS (cont)																					
110392A1	911217	15:00	17	88.0	49.00	b	80.00	f	52.00	b	28.00	f	30.00	a	10.00	f	30.00	a	5.00	f	1020.00
110393A1	911218	13:30	23	89.0	45.00	a	90.00	a	45.00	a	34.00	a	34.00	a	34.00	a	34.00	a	45.00	a	669.00
110394A1	911219	14:15	9	90.0	35.00	f	98.00	a	34.00	f	37.00	a	37.00	a	37.00	a	37.00	a	49.00	a	845.00
110395A1	911219	14:30	3	91.0	35.00	f	44.00	f	28.00	f	12.00	f	41.00	a	41.00	a	41.00	a	55.00	a	685.00
110396A1	911219	14:45	19	92.0	42.00	f	50.00	f	42.00	f	19.00	f	29.00	f	46.00	a	46.00	a	62.00	a	889.00
110396A2	911219	14:45	19	92.0	30.00	f	50.00	f	34.00	f	13.00	f	14.00	f	46.00	a	46.00	a	62.00	a	771.00
110397A1	911219	15:15	18	90.0	37.00	f	55.00	f	35.00	f	13.00	f	19.00	f	37.00	a	37.00	a	49.00	a	766.00
110398A1	920310	07:40	16	86.0	73.00	b	110.00	b	51.00	b	19.00	f	13.00	f	27.00	a	27.00	a	36.00	a	1271.00
110399A1	920310	08:40	17	89.0	66.00	b	91.00	f	44.00	f	17.00	f	34.00	a	34.00	a	34.00	a	45.00	a	960.00
110400A1	920310	10:40	12A	88.0	82.00	b	140.00	b	60.00	b	27.00	f	12.00	f	5.00	f	30.00	a	40.00	a	1045.00
110401A1	920317	12:40	1	88.0	79.00	b	130.00	b	52.00	b	38.00	b	10.00	f	32.00	a	32.00	a	42.00	a	1141.00
110402A1	920318	14:40	9	87.0	44.00	f	55.00	f	29.00	f	7.00	f	29.00	a	29.00	a	29.00	a	38.00	a	634.00
110403A1	920318	15:08	3	88.0	36.00	f	49.00	f	25.00	f	7.00	f	31.00	a	31.00	a	31.00	a	41.00	a	585.00
110404A1	920318	15:35	19	88.0	48.00	b	60.00	f	29.00	f	9.00	f	31.00	a	31.00	a	31.00	a	42.00	a	682.00
110405A1	920318	16:19	18	88.0	54.00	b	68.00	f	36.00	f	8.00	f	31.00	a	31.00	a	31.00	a	41.00	a	822.00
110405A2	920318	16:19	18	88.0	42.00	a	84.00	a	42.00	a	31.00	a	31.00	a	31.00	a	31.00	a	42.00	a	736.00
110406A1	920318	16:19	23	87.0	38.00	a	6.00	f	38.00	a	29.00	a	29.00	a	29.00	a	29.00	a	38.00	a	453.00
(I) POST DEPLOYMENT MUSSELS																					
798951A1	911023		2	84.0	33.00	b	80.00	b	43.00	b	16.00	f	18.00	f	23.00	a	23.00	a	31.00	a	832.00
798952A1	911023		2	83.0	36.00	b	58.00	a	37.00	b	13.00	f	29.00	b	22.00	a	5.00	f	29.00	a	681.00
798953A1	911023		2	85.0	40.00	f	70.00	f	37.00	f	15.00	f	34.00	f	15.00	a	15.00	a	20.00	a	859.00
798955A1	911023		8	84.0	24.00	f	40.00	f	28.00	f	23.00	a	13.00	f	23.00	a	23.00	a	31.00	a	507.00
798956A1	911023		8	82.0	18.00	f	25.00	f	21.00	f	16.00	f	20.00	a	20.00	a	20.00	a	27.00	a	409.00
798957A1	911023		8	84.0	25.00	f	60.00	a	21.00	f	6.00	f	10.00	f	22.00	a	22.00	a	30.00	a	445.00
798963A1	911023		15	85.0	41.00	b	63.00	f	43.00	b	15.00	f	22.00	f	25.00	a	25.00	a	33.00	a	758.00
798964A1	911023		15	81.0	40.00	b	78.00	b	44.00	b	14.00	f	20.00	b	4.00	f	20.00	a	5.00	f	623.00
798965A1	911023		15	84.0	45.00	b	86.00	b	60.00	b	19.00	f	31.00	f	22.00	a	22.00	a	30.00	a	798.00
798967A1	911023		19	82.0	24.00	b	45.00	f	28.00	b	9.00	f	18.00	f	20.00	a	20.00	a	27.00	a	463.00
798968A1	911023		19	83.0	21.00	f	33.00	f	23.00	f	9.00	f	14.00	f	22.00	a	2.00	f	29.00	a	387.00
(J) PRE DEPLOYMENT MUSSELS																					
798971A1	911023		22	85.0	8.00	f	64.00	a	32.00	a	24.00	a	24.00	a	24.00	a	24.00	a	32.00	a	481.00
798972A1	911023		22	83.0	9.00	f	56.00	a	8.00	f	4.00	f	6.00	f	21.00	a	15.00	f	28.00	a	340.00
798973A1	911023		22	85.0	10.00	f	9.00	f	6.00	f	24.00	a	6.00	f	24.00	a	24.00	a	32.00	a	410.00
798973A2	911023		22	85.0	6.00	f	6.00	f	3.00	f	24.00	a	24.00	a	24.00	a	24.00	a	32.00	a	289.00
(K) SEDIMENT CORE																					
110015A1	910916	10:40	15	47.0	480.00		1100.00		370.00		530.00		180.00		200.00		64.00		200.00		7018.00

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	FLRENE	PHEN	ANTH	C1	C2	C3	C4	FLUORAN	PYRENE	BAA
(K) SEDIMENT CORE (cont)														
110015B1	910916	10:40	15	42.0	43.00	230.00	130.00	250.00	200.00	87.00	17.00 a	420.00	380.00	180.00
110015C1	910916	10:40	15	56.0	190.00	1100.00	830.00	1800.00	1800.00	590.00	96.00	2300.00	2300.00	1100.00
110015D1	910916	10:40	15	54.0	200.00	1000.00	570.00	1000.00	810.00	380.00	90.00	1800.00	1500.00	1100.00
110017A1	910916	11:30	17	44.0	25.00	200.00	95.00	260.00	220.00	98.00	25.00 b	440.00	460.00	330.00
110017B1	910916	11:30	17	53.0	220.00	1500.00	660.00	3200.00	3200.00	1100.00	170.00	2600.00	4100.00	1300.00
110017C1	910916	11:30	17	50.0	61.00	180.00	210.00	590.00	500.00	120.00	55.00 b	370.00	400.00	180.00
110014A1	910916	12:30	14	28.0	67.00	640.00	400.00	1400.00	1100.00	370.00	67.00	1200.00	1100.00	680.00
110014B1	910916	12:30	14	33.0	3.00 f	26.00	11.00 b	39.00 b	39.00 b	24.00 f	33.00 b	60.00	61.00	34.00 b
110014C1	910916	12:30	14	32.0	3.00 a	3.00 a	4.00 a	7.00 a	7.00 a	14.00 a	14.00 a	6.00 a	6.00 a	7.00 a
110019A1	910916	14:00	19	53.0	38.00	330.00	170.00	490.00	390.00	160.00	42.00 a	640.00	640.00	440.00
110019A2	910916	14:00	19	53.0	38.00	340.00	130.00	470.00	470.00	210.00	42.00 a	750.00	760.00	460.00
110019B1	910916	14:00	19	56.0	60.00	380.00	160.00	430.00	330.00	170.00	29.00 b	720.00	880.00	490.00
110019C1	910916	14:00	19	51.0	29.00	79.00	91.00	280.00	320.00	130.00	20.00 a	170.00	160.00	110.00
110004A1	910916	14:30	4	67.0	27.00	210.00	67.00	220.00	190.00	80.00 b	30.00 a	480.00	470.00	220.00
110004B1	910916	14:30	4	65.0	25.00	200.00	93.00	250.00	240.00	120.00	28.00 a	410.00	420.00	220.00
110003A1	910918	10:30	3	48.0	33.00	320.00	160.00	380.00	290.00	110.00	23.00 b	700.00	610.00	390.00
110003B1	910918	10:30	3	47.0	56.00	440.00	180.00	420.00	360.00	120.00	39.00 b	750.00	670.00	340.00
110005A1	910918	11:10	5	60.0	37.00	240.00	75.00	220.00	200.00	91.00	25.00 a	510.00	480.00	240.00
110005B1	910918	11:10	5	63.0	22.00	210.00	63.00	230.00	200.00	96.00	26.00 a	450.00	480.00	280.00
110005C1	910918	11:10	5	66.0	40.00	330.00	130.00	410.00	360.00	140.00	30.00 a	580.00	700.00	240.00
110007A1	910918	11:30	7	65.0	28.00	260.00	78.00	280.00	250.00	95.00	28.00 a	570.00	570.00	340.00
110007B1	910918	11:30	7	56.0	34.00	280.00	80.00	250.00	190.00	84.00 a	22.00	460.00	520.00	210.00
110007C1	910918	11:30	7	22.0	2.00 a	2.00 a	4.00 a	6.00 a	6.00 a	12.00 a	12.00 a	5.00 a	5.00 a	6.00 a
110008A1	910918	12:00	8	59.0	57.00	380.00	100.00	300.00	270.00	88.00	24.00 a	720.00	640.00	320.00
110008B1	910918	12:00	8	61.0	22.00	180.00	76.00	200.00	150.00	58.00 b	25.00 a	400.00	350.00	150.00
110006A1	910918	12:30	6	64.0	29.00	230.00	73.00	220.00	210.00	69.00	27.00 a	470.00	450.00	220.00
110006B1	910918	12:30	6	24.0	3.00 a	3.00 a	4.00 a	7.00 a	7.00 a	13.00 a	13.00 a	5.00 a	5.00 a	7.00 a
110006B2	910918	12:30	6	24.0	3.00 a	3.00 a	4.00 a	7.00 a	7.00 a	13.00 a	13.00 a	5.00 a	10.00 b	7.00 a
110001A1	910919	09:45	1	28.0	5.00 b	51.00	18.00	57.00	44.00	18.00 b	14.00 a	120.00	100.00	52.00
110001B1	910919	09:45	1	31.0	10.00	79.00	28.00	73.00	64.00	24.00 b	14.00 a	140.00	130.00	69.00
110010A1	910926	10:00	10	51.0	41.00	280.00	130.00	300.00	280.00	130.00	20.00 a	760.00	640.00	310.00
110010B1	910926	10:00	10	54.0	280.00	6200.00	1900.00	2400.00	920.00	330.00	21.00 a	14000.00	10000.00	3600.00
110010C1	910926	10:00	10	51.0	95.00	640.00	230.00	420.00	320.00	150.00	20.00 a	890.00	750.00	350.00
110010D1	910926	10:00	10	51.0	110.00	1700.00	580.00	880.00	520.00	300.00	20.00 a	3800.00	3000.00	940.00
110010E1	910926	10:00	10	45.0	230.00	1600.00	640.00	1300.00	1000.00	610.00	71.00	3300.00	2600.00	1000.00
110012A1	910926	11:00	12	36.0	89.00	690.00	280.00	480.00	350.00	150.00	15.00 a	1300.00	1300.00	620.00
110012B1	910926	11:00	12	36.0	38.00	200.00	59.00	190.00	170.00	56.00	26.00 b	360.00	650.00	190.00
110012C1	910926	11:00	12	53.0	100.00	710.00	360.00	550.00	530.00	100.00	73.00	1200.00	2600.00	650.00
110012C2	910926	11:00	12	53.0	100.00	710.00	290.00	750.00	570.00	82.00	70.00	1000.00	2100.00	450.00

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	CHRYS	SUMBENZ	BEP	BAP	PERYLEN	INDEN123	DIBAHA	BGHIPER	SUM
(K) SEDIMENT CORE (cont)													
110015B1	910916	10:40	15	42.0	150.00	760.00	330.00	450.00	160.00	170.00	60.00	150.00	4167.00
110015C1	910916	10:40	15	56.0	930.00	2900.00	1100.00	1500.00	370.00	600.00	160.00	590.00	20256.00
110015D1	910916	10:40	15	54.0	810.00	1800.00	680.00	960.00	470.00	530.00	110.00	560.00	14370.00
110017A1	910916	11:30	17	44.0	260.00	680.00	300.00	390.00	120.00	190.00	44.00	190.00	4327.00
110017B1	910916	11:30	17	53.0	1400.00	4200.00	1900.00	2300.00	480.00	640.00	270.00	780.00	30020.00
110017C1	910916	11:30	17	50.0	150.00	390.00	130.00	170.00	810.00	59.00	29.00 b	48.00	4452.00
110014A1	910916	12:30	14	28.0	560.00	1200.00	360.00	610.00	150.00	180.00	66.00	150.00	10300.00
110014B1	910916	12:30	14	33.0	35.00 b	66.00 b	24.00 b	36.00 b	23.00 b	18.00 b	15.00 a	14.00 f	561.00
110014C1	910916	12:30	14	32.0	7.00 a	14.00 a	7.00 a	7.00 a	7.00 a	7.00 a	7.00 a	7.00 a	134.00
110019A1	910916	14:00	19	53.0	490.00	1100.00	390.00	520.00	180.00	240.00	58.00 b	170.00	6488.00
110019A2	910916	14:00	19	53.0	520.00	1100.00	440.00	590.00	170.00	290.00	68.00 b	230.00	7078.00
110019B1	910916	14:00	19	56.0	520.00	1100.00	470.00	590.00	200.00	200.00	74.00	220.00	7023.00
110019C1	910916	14:00	19	51.0	88.00	150.00	61.00	110.00	790.00	23.00 b	11.00 b	20.00 b	2642.00
110004A1	910916	14:30	4	67.0	260.00	650.00	260.00	330.00	140.00	190.00	58.00	190.00	4072.00
110004B1	910916	14:30	4	65.0	200.00	670.00	220.00	320.00	120.00	150.00	72.00	140.00	3898.00
110003A1	910918	10:30	3	48.0	350.00	670.00	240.00	370.00	110.00	150.00	84.00	130.00	5120.00
110003B1	910918	10:30	3	47.0	280.00	520.00	200.00	260.00	84.00	120.00	23.00 b	110.00	4972.00
110005A1	910918	11:10	5	60.0	280.00	790.00	250.00	310.00	120.00	120.00	43.00	120.00	4151.00
110005B1	910918	11:10	5	63.0	260.00	720.00	300.00	340.00	200.00	230.00	45.00	230.00	4382.00
110005C1	910918	11:10	5	66.0	330.00	830.00	340.00	370.00	280.00	150.00	51.00	150.00	5461.00
110007A1	910918	11:30	7	65.0	350.00	700.00	250.00	320.00	110.00	170.00	71.00	180.00	4650.00
110007B1	910918	11:30	7	56.0	250.00	760.00	360.00	340.00	150.00	190.00	40.00	200.00	4420.00
110007C1	910918	11:30	7	22.0	6.00 a	12.00 a	6.00 a	6.00 a	6.00 a	6.00 a	6.00 a	6.00 a	114.00
110008A1	910918	12:00	8	59.0	330.00	940.00	300.00	380.00	150.00	160.00	48.00	150.00	5357.00
110008B1	910918	12:00	8	61.0	160.00	570.00	210.00	270.00	170.00	90.00	12.00 a	87.00	3180.00
110006A1	910918	12:30	6	64.0	280.00	520.00	220.00	240.00	120.00	110.00	24.00 b	110.00	3622.00
110006B1	910918	12:30	6	24.0	7.00 a	13.00 a	7.00 a	7.00 a	7.00 a	7.00 a	7.00 a	7.00 a	129.00
110006B2	910918	12:30	6	24.0	7.00 a	13.00 a	5.00 a	5.00 a	5.00 a	5.00 a	5.00 a	5.00 a	122.00
110001A1	910919	09:45	1	28.0	66.00	110.00	44.00	52.00	17.00 b	28.00	10.00 b	26.00	832.00
110001B1	910919	09:45	1	31.0	75.00	160.00	63.00	79.00	28.00	39.00	22.00 b	39.00	1136.00
110010A1	910926	10:00	10	51.0	390.00	1000.00	320.00	400.00	160.00	130.00	40.00	120.00	5451.00
110010B1	910926	10:00	10	54.0	3200.00	5200.00	1500.00	2200.00	860.00	600.00	240.00	550.00	54001.00
110010C1	910926	10:00	10	51.0	300.00	880.00	360.00	430.00	140.00	140.00	35.00 b	130.00	6280.00
110010D1	910926	10:00	10	51.0	910.00	1600.00	510.00	600.00	330.00	170.00	10.00 a	130.00	16110.00
110010E1	910926	10:00	10	45.0	1100.00	2100.00	680.00	840.00	310.00	290.00	55.00	244.00	17970.00
110012A1	910926	11:00	12	36.0	650.00	1200.00	500.00	670.00	200.00	270.00	87.00	240.00	9091.00
110012B1	910926	11:00	12	36.0	310.00	760.00	300.00	320.00	100.00	160.00	30.00	180.00	4099.00
110012C1	910926	11:00	12	53.0	1500.00	3300.00	1000.00	1300.00	370.00	460.00	170.00	470.00	15443.00
110012C2	910926	11:00	12	53.0	1500.00	2600.00	780.00	970.00	250.00	290.00	96.00	270.00	12878.00

(Contd)

EPAID	CDATE	CTIME	STA	$\%H_2O$	FLRENE	PHEN	ANTH	C1	C2	C3	C4	FLUORAN	PYRENE	BAA
(K) SEDIMENT CORE (cont)														
110021A1	911115	11:00	21	43.0	22.00	160.00	57.00	190.00	120.00	42.00 b	23.00 a	280.00	280.00	150.00
110021B1	911115	11:00	21	39.0	4.00 a	27.00	16.00 b	73.00	80.00	28.00 b	21.00 a	85.00	102.00	63.00
110021B2	911115	11:00	21	39.0	5.00 b	29.00	15.00 b	80.00	80.00	39.00 b	22.00 a	69.00	80.00	50.00
110021C1	911115	11:00	21	38.0	4.00 a	1.00 f	6.00 a	18.00 a	10.00 a	20.00 a	20.00 a	1.00 f	1.00 f	10.00 a
110021D1	911115	11:00	21	30.0	4.00 a	4.00 a	6.00 a	9.00 a	9.00 a	19.00 a	19.00 a	8.00 a	8.00 a	9.00 a
(L) SEDIMENT GRAB														
110210B1	910909	14:09	19	52.0	18.00	190.00	72.00	280.00	240.00	100.00	20.00 a	460.00	550.00	370.00
110210D1	910909	14:45	19	51.0	43.00	290.00	120.00	210.00	330.00	120.00	20.00 a	510.00	590.00	370.00
110210E1	910909	15:00	19	51.0	30.00	330.00	120.00	370.00	310.00	110.00	20.00 a	640.00	640.00	390.00
110210F1	910909	15:08	19	48.0	22.00	200.00	100.00	260.00	270.00	100.00	20.00 a	460.00	460.00	350.00
110211C1	910909	16:05	18	5.0	250.00	1600.00	570.00	1300.00	740.00	370.00	50.00 b	1800.00	1400.00	750.00
110211C2	910909	16:05	18	5.0	1100.00	4400.00	1800.00	3800.00	2200.00	820.00	20.00 a	4200.00	3400.00	2000.00
110213C1	910910	08:30	21	28.0	6.00 b	71.00	25.00	84.00	74.00	37.00 b	18.00 f	160.00	150.00	74.00
110212C1	910910	10:30	16	24.0	6.00 b	57.00	16.00 b	71.00	66.00	44.00	25.00 a	160.00	130.00	77.00
110215C1	910910	11:35	15	51.0	42.00	340.00	110.00	340.00	310.00	170.00	150.00	800.00	680.00	310.00
110214C1	910910	12:45	14	11.0	31.00	360.00	260.00	380.00	250.00	130.00	21.00 a	890.00	770.00	400.00
110216C1	910910	14:15	11	38.0	42.00	410.00	230.00	350.00	230.00	80.00 b	140.00	760.00	670.00	340.00
110217B1	910910	15:25	17	41.0	41.00	350.00	160.00	350.00	240.00	31.00 b	20.00 a	660.00	770.00	470.00
110217D1	910910	15:40	17	39.0	26.00	210.00	97.00	290.00	160.00	45.00 b	20.00 a	420.00	470.00	270.00
110217E1	910910	15:55	17	41.0	28.00	220.00	100.00	170.00	140.00	40.00 b	17.00 a	550.00	570.00	350.00
110217F1	910910	16:10	17	47.0	45.00	320.00	200.00	580.00	310.00	54.00 b	20.00 a	700.00	760.00	490.00
110218C1	910911	10:55	12	35.0	150.00	1500.00	650.00	760.00	360.00	140.00	29.00 a	1800.00	1500.00	800.00
110219C1	910911	12:30	13	45.0	66.00	550.00	224.00	494.00	345.00	127.00	35.00 a	1100.00	920.00	450.00
110220B1	910911	13:45	10	55.0	40.00	340.00	120.00	260.00	180.00	130.00	20.00 a	750.00	650.00	370.00
110220B2	910911	13:45	10	55.0	47.00	380.00	250.00	350.00	220.00	84.00	22.00 a	1000.00	860.00	560.00
110220D1	910911	13:55	10	60.0	28.00	160.00	72.00	160.00	140.00	53.00 b	25.00 a	310.00	300.00	160.00
110220E1	910911	14:07	10	52.0	51.00	300.00	100.00	300.00	150.00	25.00 b	20.00 a	530.00	500.00	260.00
110220F1	910911	14:12	10	58.0	19.00	160.00	52.00	140.00	110.00	52.00 b	20.00 a	330.00	300.00	160.00
110222C1	910911	16:55	4	61.0	29.00 b	210.00	79.00	210.00	183.00	71.00 b	50.00 a	360.00	400.00	210.00
110223C1	910912	09:55	20	22.0	5.00 a	12.00 b	4.00 f	8.00 f	12.00 a	24.00 a	24.00 a	32.00	30.00	17.00 b
110232C1	910912	10:05	5	45.0	20.00 b	150.00	42.00	150.00	120.00	62.00 b	40.00 a	240.00	270.00	150.00
110225B1	910912	14:05	8	69.0	7.00 f	440.00	120.00	260.00	67.00 b	130.00 a	130.00 a	1000.00	940.00	450.00
110225D1	910912	14:20	8	58.0	27.00	210.00	79.00	100.00	61.00	30.00 a	30.00 a	390.00	350.00	180.00
110225E1	910912	14:35	8	65.0	25.00	230.00	86.00	200.00	120.00	58.00 b	28.00 a	470.00	480.00	230.00
110225F1	910912	14:50	8	59.0	21.00 b	450.00	100.00	220.00	51.00 b	96.00 a	96.00 a	830.00	760.00	290.00
110226B1	910912	15:05	7	68.0	69.00	530.00	190.00	200.00	200.00	100.00	30.00 a	780.00	750.00	360.00
110226D1	910912	15:20	7	66.0	24.00	223.00	63.00	15.00 a	140.00	36.00 b	30.00 a	470.00	460.00	190.00
110226D2	910912	15:20	7	66.0	26.00	190.00	63.00	190.00	130.00	30.00 a	30.00 a	390.00	410.00	200.00

(Contd)

EPAID	CDATE	CTIMESTA		$\%H_2O$	CHRYS	SUMBENZ	BEP	BAP	PERYLEN	INDEN123	DIBAHA	BGHIPER	SUM
(K) SEDIMENT CORE (cont)													
110021A1	911115	11:00	21	43.0	150.00	580.00	190.00	270.00	78.00	140.00	36.00	120.00	2888.00
110021B1	911115	11:00	21	39.0	47.00	160.00	43.00	72.00	24.00 b	28.00 b	11.00 b	27.00 b	911.00
110021B2	911115	11:00	21	39.0	43.00	130.00	44.00	59.00	28.00 b	19.00 b	11.00 a	16.00 b	819.00
110021C1	911115	11:00	21	38.0	10.00 a	2.00 f	10.00 a	10.00 a	22.00 b	10.00 a	10.00 a	10.00 a	175.00
110021D1	911115	11:00	21	30.0	9.00 a	19.00 a	9.00 a	9.00 a	10.00 b	9.00 a	9.00 a	9.00 a	178.00
(L) SEDIMENT GRAB													
110210B1	910909	14:09	19	52.0	370.00	600.00	260.00	240.00	120.00	180.00	28.00 b	210.00	4308.00
110210D1	910909	14:45	19	51.0	310.00	810.00	330.00	510.00	130.00	220.00	70.00	250.00	5233.00
110210E1	910909	15:00	19	51.0	370.00	590.00	240.00	350.00	100.00	180.00	46.00	200.00	5036.00
110210F1	910909	15:08	19	48.0	360.00	710.00	320.00	450.00	95.00	180.00	55.00	230.00	4642.00
110211C1	910909	16:05	18	5.0	830.00	1700.00	570.00	860.00	250.00	430.00	98.00	310.00	13878.00
110211C2	910909	16:05	18	5.0	1800.00	4600.00	1500.00	2300.00	610.00	950.00	230.00	660.00	36390.00
110213C1	910910	08:30	21	28.0	87.00	260.00	94.00	120.00	40.00 b	60.00	14.00 a	48.00	1422.00
110212C1	910910	10:30	16	24.0	12.00 f	190.00	72.00	170.00	30.00 b	52.00	14.00 b	42.00	1234.00
110215C1	910910	11:35	15	51.0	360.00	800.00	300.00	400.00	150.00	220.00	55.00 b	170.00	5707.00
110214C1	910910	12:45	14	11.0	380.00	840.00	280.00	460.00	130.00	290.00	84.00	220.00	6176.00
110216C1	910910	14:15	11	38.0	360.00	1000.00	290.00	430.00	130.00	190.00	44.00 b	130.00	5826.00
110217B1	910910	15:25	17	41.0	400.00	890.00	300.00	410.00	120.00	190.00	60.00	210.00	5672.00
110217D1	910910	15:40	17	39.0	280.00	610.00	230.00	330.00	86.00	150.00	26.00	170.00	3890.00
110217E1	910910	15:55	17	41.0	320.00	730.00	270.00	400.00	120.00	150.00	76.00	170.00	4421.00
110217F1	910910	16:10	17	47.0	440.00	950.00	360.00	550.00	140.00	230.00	91.00	270.00	6510.00
110218C1	910911	10:55	12	35.0	1300.00	2100.00	580.00	820.00	230.00	320.00	84.00	240.00	13363.00
110219C1	910911	12:30	13	45.0	480.00	1100.00	340.00	490.00	150.00	260.00	57.00	220.00	7408.00
110220B1	910911	13:45	10	55.0	380.00	580.00	200.00	240.00	86.00	130.00	54.00	120.00	4650.00
110220B2	910911	13:45	10	55.0	540.00	740.00	240.00	330.00	100.00	150.00	28.00 b	150.00	6051.00
110220D1	910911	13:55	10	60.0	140.00	380.00	160.00	200.00	76.00	120.00	47.00	120.00	2651.00
110220E1	910911	14:07	10	52.0	270.00	550.00	190.00	250.00	77.00	120.00	22.00 b	110.00	3825.00
110220F1	910911	14:12	10	58.0	160.00	280.00	120.00	140.00	58.00	91.00	26.00 b	95.00	2313.00
110222C1	910911	16:55	4	61.0	260.00	780.00	250.00	330.00	120.00	210.00	53.00 b	180.00	3985.00
110223C1	910912	09:55	20	22.0	19.00 b	44.00 b	14.00 b	18.00 b	17.00 b	5.00 f	10.00 a	3.00 f	298.00
110232C1	910912	10:05	5	45.0	160.00	440.00	160.00	200.00	79.00	140.00	31.00 b	110.00	2564.00
110225B1	910912	14:05	8	69.0	520.00	1000.00	420.00	570.00	170.00	340.00	48.00 f	380.00	6992.00
110225D1	910912	14:20	8	58.0	180.00	500.00	160.00	230.00	76.00	110.00	56.00	120.00	2889.00
110225E1	910912	14:35	8	65.0	250.00	540.00	210.00	270.00	98.00	160.00	25.00 b	160.00	3640.00
110225F1	910912	14:50	8	59.0	360.00	760.00	300.00	400.00	120.00 b	230.00	48.00 a	270.00	5402.00
110226B1	910912	15:05	7	68.0	420.00	960.00	330.00	410.00	130.00	260.00	25.00 b	220.00	5964.00
110226D1	910912	15:20	7	66.0	230.00	630.00	230.00	290.00	100.00	160.00	33.00 b	160.00	3481.00
110226D2	910912	15:20	7	66.0	190.00	600.00	210.00	270.00	120.00	150.00	35.00 b	150.00	3384.00

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	FLRENE	PHEN	ANTH	C1	C2	C3	C4	FLUORAN	PYRENE	BAA
(L) SEDIMENT GRAB (cont)														
110226E1	910912	15:35	7	64.0	29.00	250.00	80.00	190.00	150.00	29.00 b	28.00 a	520.00	560.00	260.00
110226F1	910912	15:50	7	63.0	41.00	350.00	120.00	340.00	220.00	27.00 b	27.00 a	720.00	710.00	380.00
110227C1	910913	12:35	23	29.0	6.00 b	74.00	13.00 b	66.00	49.00	17.00 f	28.00 a	150.00	130.00	65.00
110228C1	910913	13:50	22	27.0	5.00 b	55.00	17.00 b	32.00	10.00 f	25.00 a	25.00 a	74.00	59.00	24.00 b
110229C1	910916	10:05	9	36.0	75.00	490.00	250.00	490.00	580.00	290.00	840.00	570.00	500.00	330.00
110230C1	910916	11:20	2	52.0	82.00	630.00	280.00	660.00	470.00	200.00	150.00	1000.00	960.00	600.00
110221C1	910916	12:15	1	30.0	6.00 b	50.00	13.00 b	50.00	37.00 b	13.00 f	27.00 a	96.00	92.00	41.00
(M) SEEPS														
112327A1	920213	12:15	S3		1.00 a	1.00 a	1.00 a	2.00 a	2.00 a	4.00 a	4.00 a	2.00 a	2.00 a	2.00 a
112326A1	920213	12:20	S2		1.00 a	1.00 a	1.00 a	2.00 a	2.00 a	4.00 a	4.00 a	2.00 a	2.00 a	2.00 a
112325A1	920213	12:30	S1		1.00 a	1.00 a	1.00 a	2.00 a	2.00 a	4.00 a	4.00 a	2.00 a	2.00 a	2.00 a
112325B1	920213	12:30	S1		1.00 a	1.00 a	1.00 a	2.00 a	2.00 a	4.00 a	4.00 a	2.00 a	2.00 a	2.00 a
112325B2	920213	12:30	S1		1.00 a	1.00 a	1.00 a	2.00 a	2.00 a	4.00 a	4.00 a	2.00 a	2.00 a	2.00 a

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	CHRYS	SUMBENZ	BEP	BAP	PERYLEN	INDEN123	DIBAHA	BGHIPER	SUM
(L) SEDIMENT GRAB (cont)													
110226E1	910912	15:35	7	64.0	240.00	680.00	260.00	310.00	100.00	170.00	31.00 b	140.00	4027.00
110226F1	910912	15:50	7	63.0	340.00	790.00	280.00	350.00	120.00	160.00	65.00	150.00	5190.00
110227C1	910913	12:35	23	29.0	76.00	170.00	60.00	84.00	24.00 b	57.00	14.00 f	45.00 b	1128.00
110228C1	910913	13:50	22	27.0	25.00 b	52.00 b	18.00 b	27.00 b	8.00 f	12.00 f	12.00 a	8.00 f	488.00
110229C1	910916	10:05	9	36.0	320.00	850.00	240.00	380.00	110.00	170.00	44.00 b	120.00	6649.00
110230C1	910916	11:20	2	52.0	630.00	1400.00	480.00	700.00	200.00	380.00	120.00	290.00	9232.00
110221C1	910916	12:15	1	30.0	49.00	120.00	47.00	58.00	17.00 b	45.00	7.00 f	37.00 b	805.00
(M) SEEPS													
112327A1	920213	12:15	S3		2.00 a	4.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	39.00
112326A1	920213	12:20	S2		2.00 a	4.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	39.00
112325A1	920213	12:30	S1		2.00 a	4.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	39.00
112325B1	920213	12:30	S1		2.00 a	4.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	39.00
112325B2	920213	12:30	S1		2.00 a	4.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	2.00 a	39.00

3. POLYCHLORINATED BIPHENYLS

VARIABLE	DESCRIPTION	VARIABLE	DESCRIPTION
%$H_2$0	Percent moisture	%$H_2$0	Percent moisture
PCB8	8 (2 4')	PCB138	138 (2 2' 3 4 4' 5)
PCB18	18 (2 2' 5)	PCB187	187 (2 2' 3 4' 5 5' 6)
PCB28	28 (2 4 4')	PCB128	128 (2 2' 3 3' 4 4')
PCB52	52 (2 2' 5 5')	PCB180	180 (2 2' 3 4 4' 5 5')
PCB44	44 (2 2' 3 5')	PCB170	170 (2 2' 3 3' 4 4' 5)
PCB66	66 (2 3' 4 4')	PCB195	195 (2 2' 3 3' 4 4' 5 6)
PCB101	101 (2 2' 4 5 5')	PCB206	206 (2 2' 3 3' 4 4' 5 5' 6)
PCB118	118 (2 3' 4 4' 5)	PCB209	209 (2 2' 3 3' 4 4' 5 5' 6 6')
PCB153	153 (2 2' 4 4' 5 5')	SUM	Sum of Congeners.
PCB105	105 (2 3 3' 4 4')		

DATA QUALIFIER CODES:

- a Analyte was not detected below the method detection limit (MDL) shown.
- b Reported value was below the limit of quantification (LOQ).
- c Not reported due to matrix interference.
- d Not quantified.
- e Not reported.
- f Reported value was below the MDL.
- h Quantification was based on alternate internal standard.
- j Analysis was performed with selected ion monitoring.
- p Value shown may be biased because recovery of the analyte in reference material was outside the desired range.
- u Analyte was not detected at the instrument detection limit.

POLYCHLORINATED BIPHENYL CONGENER CONCENTRATIONS (µg/Kg) and DATA FLAGS

EPAID	CDATE	CTIME	STA	%H_2O	PCB8	PCB18	PCB28	PCB52	PCB44	PCB66	PCB101	PCB118	PCB153	PCB105
(A) EELGRASS LEAVES														
110042A1	910916	13:30	3	15.0	0.50 a	0.50 a	0.50 a	0.50 b	0.50 a	1.80	0.60 b	0.90 b	0.90 b	0.50 b
110042A2	910916	13:30	3	15.0	0.50 a	0.50 a	0.50 a	0.60 b	0.50 a	1.60	0.60 b	1.00 b	1.00 b	0.50 b
110044A1	910917	14:30	19	10.0	1.00 b	0.50 a	0.50 a	0.50 b	0.50 a	1.30 b	0.60 b	0.80 b	1.10 b	0.60 b
110053A1	911022	16:30	12A	10.0	0.60 a	0.90 b	5.90	1.70 b	1.00 b	1.00 b	2.30	1.20 b	1.20 b	13.00 a
110053A2	911022	16:30	12A	10.0	0.60 a	0.80 b	6.00	1.50 b	0.70 b	4.30	1.90	1.10 b	1.40 b	49.00
(B) EELGRASS ROOTS														
110042C1	910916	13:30	3	12.0	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.80 b	0.50 b	0.50 b	1.00 b	0.50 a
110044C1	910917	14:30	19	10.0	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.70 b	0.50 a	0.60 b	0.50 a
(C) FLOUNDER FLESH														
110180A1	910923	09:10	T2	78.0	0.56 a	0.53 f	0.62 b	0.23 f	0.56 a	0.64 b	0.56 b	1.85 b	4.26	2.76
110183A1	910925	08:00	T4	80.0	1.17 b	0.93 b	2.93	1.42 b	0.55 f	6.13	4.29	8.26	19.40	6.31
110182A1	910925	08:45	T7	75.0	2.00 a	2.00 a	3.90 b	2.00 a	2.00 a	7.20	4.80 b	11.00	34.00	6.20
110184A1	910925	10:10	T9	79.0	0.42 f	0.76 b	5.14	1.60 b	0.37 f	5.65	3.19	5.67	12.13	5.76
110181A1	910925	13:50	T5	77.0	0.50 a	0.70 b	7.60	3.60	3.00	21.00	8.50	19.00	37.00	8.80
110186A1	910926	08:50	T3	78.0	2.55	0.66 b	2.73	1.22 b	0.34 f	0.52 a	1.94	3.47	9.71	0.52 a
110185A1	910926	10:32	T6	80.0	0.61 a	0.05 f	0.91 b	0.28 f	0.11 f	0.61 a	0.61 a	0.61 a	0.61 a	0.61 a
110187A1	910926	12:36	T8	80.0	0.60 a	0.60 a	1.20 b	2.20	0.90 b	6.70	4.50	4.00	13.00	0.60 a
110188A1	910927	09:00	T1	76.0	0.51 a	0.30 f	0.31 f	0.07 f	0.12 f	1.81	0.69 b	3.87	5.58	3.45
(D) FLOUNDER LIVER														
110180B1	910923	09:10	T2	71.0	12.89	1.63 f	5.58	3.44 b	1.05 f	9.24	7.10	18.52	1.69 a	14.47
110183B1	910925	08:00	T4		8.73 b	2.95 f	15.84	6.53 b	1.56 f	13.67	9.17 b	16.85	54.08	20.07
110184B1	910925	10:10	T9	71.0	85.11	24.37	223.82	72.11	24.72	255.67	113.24	1.72 a	1.72 a	1.72 a
110181B1	910925	13:50	T5	80.0	42.00 a	42.00 a	44.00 b	42.00 a	42.00 a	54.00 b	50.00 b	110.00 b	180.00	42.00 a
110186B1	910926	08:50	T3	64.0	65.98	6.94	55.54	30.24	6.21	1.33 a	60.16	131.10	259.47	98.44
110185B1	910926	10:32	T6	71.0	9.39 b	5.74 b	20.97	6.82 b	3.28 f	34.99	26.22	80.25	185.20	3.74 a
110187B1	910926	12:36	T8	80.0	68.00 b	25.00 a	25.00 a	42.00 b	25.00 a	110.00	93.00 b	62.00 b	250.00	25.00 a
110188B1	910927	09:00	T1	71.0	13.79	3.66 b	8.68	2.04 b	1.69 a	34.21	10.33	93.19	139.50	48.13
(E) FUCOID														
110142A1	910916	13:15	3	12.0	19.92	1.24 b	1.29 b	0.33 f	0.03 f	0.50 a	0.45 f	0.16 f	0.47 f	0.60 a
110143A1	910916	14:30	19	11.0	1.60	0.50 a	3.20	1.30 b	1.20 b	4.90	2.00	2.10	0.90	0.40 a
110144A1	910918	12:50	9	15.0	33.19	1.62 b	1.82	1.22 b	0.59 b	2.94	1.63 b	0.50 a	2.20	0.76 a
110145A1	910918	13:00	8	15.0	1.70	0.50 a	0.80 b	1.10 b	0.80 b	1.10 b	2.60	2.90	2.40	0.50 a
110145A2	910918	13:00	8	15.0	1.40 b	0.50 a	0.80 b	1.60	1.70	1.40 b	3.80	3.40	3.10	0.50 a

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB138	PCB187	PCB128	PCB180	PCB170	PCB195	PCB206	PCB209	SUM
(A) EELGRASS LEAVES													
110042A1	910916	13:30	3	15.0	1.00 b	0.50 a	0.50 a	0.50 b	0.50 a	0.50 a	0.50 a	0.50 a	11.70
110042A2	910916	13:30	3	15.0	0.80 b	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	11.60
110044A1	910917	14:30	19	10.0	2.60	0.50 a	0.50 a	0.70 b	0.50 a	0.50 a	0.50 a	0.50 a	13.70
110053A1	911022	16:30	12A	10.0	1.20 b	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	34.20
110053A2	911022	16:30	12A	10.0	0.80 b	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	72.30
(B) EELGRASS ROOTS													
110042C1	910916	13:30	3	12.0	1.10 b	0.50 a	0.50 a	0.60 b	0.50 a	0.50 a	0.80 b	0.50 a	10.80
110044C1	910917	14:30	19	10.0	1.10 b	0.50 b	0.50 a	0.50 a	1.00 b	0.50 a	0.50 a	0.50 a	10.40
(C) FLOUNDER FLESH													
110180A1	910923	09:10	T2	78.0	2.75	0.91 b	0.39 f	1.26 b	0.56 a	0.56 a	0.63 b	0.49 f	20.20
110183A1	910925	08:00	T4	80.0	11.38	3.91	2.96	4.42	3.63	0.61 f	3.00	1.24 b	82.63
110182A1	910925	08:45	T7	75.0	22.00	6.30	4.00 b	9.70	7.70	2.00 a	2.00 a	2.00 a	130.80
110184A1	910925	10:10	T9	79.0	7.91	1.95 b	2.41	3.37	2.67	0.50 f	1.61 b	0.62 b	61.78
110181A1	910925	13:50	T5	77.0	23.00	8.10	5.70	10.00	6.10	0.50 a	6.10	4.70	173.90
110186A1	910926	08:50	T3	78.0	5.39	2.07	0.52 a	2.37	1.91	0.52 a	1.63 b	1.01 b	39.16
110185A1	910926	10:32	T6	80.0	0.61 a	3.26	0.57 f	0.61 a	0.61 a	0.61 a	0.61 a	3.94	15.92
110187A1	910926	12:36	T8	80.0	9.50	2.70	2.10	3.60	1.10 b	0.60 a	0.60 a	2.40 a	56.90
110188A1	910927	09:00	T1	76.0	3.92	0.78 b	0.27 f	3.00	0.51 a	0.28 f	0.31 f	0.36 f	26.24
(D) FLOUNDER LIVER													
110180B1	910923	09:10	T2	71.0	52.36	11.87	8.64	26.83	10.02	3.19 b	11.80	3.25 b	203.64
110183B1	910925	08:00	T4		30.66	13.34	10.96 b	14.45	10.00 b	5.57 b	11.35 b	7.18 b	253.03
110184B1	910925	10:10	T9	71.0	267.92	71.59	62.24	1.72 a	1.72 a	11.03	33.32	7.58	1261.36
110181B1	910925	13:50	T5	80.0	150.00	49.00 b	42.00 a	54.00 b	65.00 b	42.00 a	42.00 a	42.00 a	1134.00
110186B1	910926	08:50	T3	64.0	176.76	58.83	48.76	1.33 a	1.33 a	12.42	44.05	7.34	1066.31
110185B1	910926	10:32	T6	71.0	98.30	38.95	20.29	58.20	35.13	12.63	49.52	6.85 b	696.55
110187B1	910926	12:36	T8	80.0	160.00	58.00 b	36.00 b	59.00 b	25.00 a	25.00 a	25.00 a	140.00	1253.00
110188B1	910927	09:00	T1	71.0	99.21	21.96	12.01	110.83	36.94	5.62	12.96	3.48 b	658.29
(E) FUCOID													
110142A1	910916	13:15	3	12.0	0.30 f	0.35 f	0.36 f	0.31 f	0.30 f	0.50 a	0.50 a	0.50 a	28.17
110143A1	910916	14:30	19	11.0	1.30 b	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	22.90
110144A1	910918	12:50	9	15.0	1.39 b	0.69 b	0.45 f	0.27 f	0.32 f	0.50 a	0.50 a	0.50 a	51.17
110145A1	910918	13:00	8	15.0	2.00	0.50 a	0.70 b	0.50 b	0.50 a	0.50 a	0.50 a	0.50 a	20.10
110145A2	910918	13:00	8	15.0	3.00	0.50 b	0.90 b	0.50 b	0.50 a	0.50 a	0.50 a	0.50 a	25.10

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB8	PCB18	PCB28	PCB52	PCB44	PCB66	PCB101	PCB118	PCB153	PCB105
(E) FUCOID (cont)														
110146A1	910918	13:30	10	14.0	1.30 b	0.50 a	0.50 a	0.50 a	0.50 a	1.10 b	0.60 b	0.50 a	0.60 b	0.50 a
110147A1	910918	14:00	17	15.0	19.58	1.62 b	0.38 f	0.69 b	0.59 b	0.50 a	0.84 b	0.48 f	0.89 b	0.77 a
110147A2	910918	14:00	17	15.0	23.63	2.11	0.54 b	0.55 b	0.31 f	0.50 a	0.86 b	0.40 f	0.79 b	0.99 b
110148A1	910927	08:30	10A	14.0	11.21	1.57 b	1.40 b	1.04 b	0.84 b	1.74	1.33 b	0.09	1.85	1.07 a
110149A1	910927	09:30	10A	16.0	1.20 b	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	1.20 b	0.50 a	2.40	1.90
110141A1	911007	18:00	22	16.0	5.61	3.01	1.31 b	0.27 f	0.24 f	0.00 f	0.32 f	0.09 f	0.31 f	0.74 a
(F) LOBSTER HEPATOPANCREAS														
110150B1	910923	09:10	T2	53.0	149.81	0.08 f	0.98 a	24.08	5.13	0.98 a	52.82	0.98 a	373.74	113.23
110153B1	910925	08:00	T4	66.0	42.95	3.09 b	48.01	19.56	4.28 b	99.51	48.21	198.16	334.43	95.83
110152B1	910925	08:45	T7	54.0	10.00	1.00 a	31.00	29.00	5.00	110.00	83.00	170.00	370.00	100.00
110154B1	910925	10:10	T9	73.0	39.03	3.80 b	148.87	18.48	4.20 b	174.09	48.33	299.03	326.47	156.28
110151B1	910925	13:50	T5	51.0	1.00 a	3.80	23.00	26.00	4.90	100.00	71.00	130.00	300.00	97.00
110156B1	910926	08:50	T3	47.0	77.15	0.94 a	85.77	33.51	3.95	107.86	50.82	163.83	196.56	65.34
110155B1	910926	10:32	T6	58.0	4.75	0.65 f	1.10 a	1.10 a	1.10 a	1.10 a	1.10 a	1.10 a	30.39	128.95
110157B1	910926	12:36	T8	60.0	12.00	1.20 a	44.00	22.00	1.20 a	130.00	52.00	250.00	410.00	190.00
110158B1	910927	09:00	T1	61.0	29.16	4.56	30.17	19.91	8.27	75.90	44.81	146.88	278.60	73.06
(G) LOBSTER TAIL FLESH														
110150A1	910923	09:10	T2	79.0	0.66 b	0.31 f	0.49 f	0.19 f	0.31 f	0.60 b	0.25 f	1.61 b	2.81	2.22
110150A2	910923	09:10	T2	79.0	0.94 b	0.25 f	0.80 b	0.31 f	0.43 f	1.06 b	0.54 f	2.24	3.57	2.68
110153A1	910925	08:00	T4	81.0	1.05 b	0.55 f	3.43	0.80 b	0.65 a	1.95 b	1.78 b	4.07	6.83	4.42
110153A2	910925	08:00	T4	81.0	0.65 a	0.45 f	2.67	0.68 b	0.65 a	2.22	1.05 b	4.28	6.18	4.72
110152A1	910925	08:45	T7	79.0	0.60 a	0.60 a	1.20 b	0.60 a	0.60 a	2.00	1.20 b	2.40	4.70	1.30 b
110154A1	910925	10:10	T9	81.0	0.57 f	0.42 f	4.46 b	0.94 f	1.72 a	4.33 b	1.67 f	8.19	8.69	5.66 b
110151A1	910925	13:50	T5	78.0	0.90 b	1.00 b	2.20	0.80 b	0.60 a	2.00	1.00 b	1.50 b	2.90	0.80 b
110156A1	910926	08:50	T3	77.0	0.87 b	0.50 f	1.10 b	0.29 f	0.53 a	0.98 b	0.57 b	1.60 b	2.31	0.53 a
110155A1	910926	10:32	T6	79.0	0.59 a	0.59 a	0.82 b	0.92 b	0.59 a	1.62 b	0.75 b	3.55	5.40	4.80
110157A1	910926	12:36	T8	79.0	0.60 a	4.90	15.00	5.10	5.70	15.00	3.10	5.50	8.20	3.20
110157A2	910926	12:36	T8	79.0	0.60 b	0.60 a	1.50 b	0.60 a	0.60 a	2.80	0.70 b	4.10	6.50	2.10
110158A1	910927	09:00	T1	81.0	0.64 a	0.71 b	0.49 f	0.30 f	0.27 f	1.93 b	0.74 b	4.65	6.20	2.90
(H) MUSSEL														
110061A1	910910	08:00	28	87.0	1.34 b	4.83	3.26	6.08	3.00 b	14.27	12.46	17.37	38.14	5.12
110070A1	910912	07:30	17	88.0	1.03 a	6.71	2.70 b	5.03	2.77 b	10.07	7.36	12.00	22.52	5.82
110070A2	910912	07:30	17	88.0	1.01 a	5.02	2.36 b	1.49 b	1.87 b	8.10	6.02	10.76	20.35	7.27
110071A1	910912	08:00	20	88.0	2.62 b	5.50	2.39 b	4.30	2.32 b	8.74	7.20	10.46	21.11	7.68
110072A1	910912	08:25	21	86.0	0.77 f	5.12	2.47 b	2.95	1.21 b	7.14	5.93	8.89	19.60	12.92
110073A1	910916	12:00	1	88.0	0.84 f	4.27	2.00 b	1.02 a	1.29 b	7.02	4.68	7.98	17.44	6.64

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB138	PCB187	PCB128	PCB180	PCB170	PCB195	PCB206	PCB209	SUM
(E) FUCOID (cont)													
110146A1	910918	13:30	10	14.0	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	10.60
110147A1	910918	14:00	17	15.0	0.46 f	0.36 f	0.34 f	0.20 f	0.09 f	0.50 a	0.50 a	0.09 f	28.94
110147A2	910918	14:00	17	15.0	0.62 b	0.86 b	0.53 b	0.42 f	0.45 f	0.50 a	0.50 a	0.07 f	34.68
110148A1	910927	08:30	10A	14.0	1.26 b	0.66 b	0.75 b	0.42 f	0.88 b	0.06 f	0.50 a	0.30 f	27.05
110149A1	910927	09:30	10A	16.0	1.20 b	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	14.40
110141A1	911007	18:00	22	16.0	0.47 f	0.50 a	0.30 f	0.13 f	0.50 a	0.04 f	0.50 a	0.10 f	14.50
(F) LOBSTER HEPATOPANCREAS													
110150B1	910923	09:10	T2	53.0	230.15	0.98 a	119.63	0.98 a	******	6.30	0.98 a	8.71	2898.61
110153B1	910925	08:00	T4	66.0	214.37	82.01	81.34	70.04	41.26	7.27	18.79	3.68 b	1412.86
110152B1	910925	08:45	T7	54.0	220.00	96.00	47.00	91.00	43.00	1.00 a	12.00	5.00	1424.00
110154B1	910925	10:10	T9	73.0	227.49	71.85	79.12	70.33	52.24	1.71 a	59.26	8.14	1788.77
110151B1	910925	13:50	T5	51.0	170.00	72.00	39.00	61.00	30.00	6.10	8.60	3.20	1146.60
110156B1	910926	08:50	T3	47.0	129.14	45.63	57.42	31.28	23.58	3.04 b	13.20	2.26 b	1091.35
110155B1	910926	10:32	T6	58.0	1.10 a	1.10 a	17.64	25.11	8.60	1.10 a	1.10 a	7.05	234.19
110157B1	910926	12:36	T8	60.0	280.00	110.00	74.00	110.00	60.00	11.00	16.00	4.30	1777.70
110158B1	910927	09:00	T1	61.0	164.61	64.33	60.63	98.60	42.09	1.20 a	29.31	8.36	1180.50
(G) LOBSTER TAIL FLESH													
110150A1	910923	09:10	T2	79.0	1.80 b	0.62 b	0.63 b	0.60 b	0.59 a	0.59 a	0.59 a	0.27 f	15.22
110150A2	910923	09:10	T2	79.0	2.08	1.10 b	1.01 b	0.63 b	0.58 a	0.58 a	0.58 a	0.16 f	19.62
110153A1	910925	08:00	T4	81.0	3.75	1.44 b	0.64 f	2.99	1.99 b	0.65 a	9.35	5.52	51.93
110153A2	910925	08:00	T4	81.0	3.75	1.55 b	1.56 b	1.87 b	2.40	0.65 a	0.82 b	0.39 f	36.61
110152A1	910925	08:45	T7	79.0	3.10	1.10 b	0.60 a	1.00 b	1.20 b	0.60 a	0.60 a	0.60 a	24.00
110154A1	910925	10:10	T9	81.0	5.40 b	1.75 b	1.77 b	1.46 f	1.19 f	1.72 a	1.72 a	0.56 f	52.29
110151A1	910925	13:50	T5	78.0	2.30	0.60 b	0.60 a	0.60 b	0.70 b	0.60 a	0.60 a	1.80	21.50
110156A1	910926	08:50	T3	77.0	1.71 b	0.53 b	0.52 f	0.44 f	1.00 b	0.53 a	0.53 a	0.05 f	14.66
110155A1	910926	10:32	T6	79.0	2.98	0.58 f	0.38 f	0.79 b	0.59 a	0.59 a	1.55 b	0.24 f	27.38
110157A1	910926	12:36	T8	79.0	6.40	1.60 b	1.10 b	1.20 b	2.00	0.60 a	0.60 a	0.60 a	80.40
110157A2	910926	12:36	T8	79.0	3.70	1.50 b	0.80 b	1.10 b	1.40 b	0.60 a	0.60 a	0.60 a	30.40
110158A1	910927	09:00	T1	81.0	3.83	1.00 b	0.50 f	1.05 b	0.64 a	0.64 a	0.64 a	0.64 a	27.83
(H) MUSSEL													
110061A1	910910	08:00	28	87.0	26.48	9.36	5.75	6.27	4.27	0.95 a	0.95 a	0.95 a	160.92
110070A1	910912	07:30	17	88.0	16.10	6.64	3.47	4.36	2.16 b	1.03 a	1.03 a	0.33 f	111.20
110070A2	910912	07:30	17	88.0	14.45	5.96	3.40	4.24	2.29 b	1.01 a	1.01 a	0.24 f	96.94
110071A1	910912	08:00	20	88.0	15.36	6.30	3.77	4.38	2.81 b	1.04 a	1.04 a	1.04 a	108.13
110072A1	910912	08:25	21	86.0	13.90	5.93	3.18	3.55	2.63 b	0.88 a	0.34 f	0.27 f	97.78
110073A1	910916	12:00	1	88.0	11.79	5.52	3.01 b	1.02 a	0.94 f	1.02 a	1.02 a	0.29 f	77.85

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EPAID	CDATE	CTIME	STA	%H_2O	PCB8	PCB18	PCB28	PCB52	PCB44	PCB66	PCB101	PCB118	PCB1[illegible]	PCB105
(H) MUSSEL (cont)														
110074A1	910916	12:45	14	88.0	1.03 a	4.76	3.42	3.76	2.79 b	3.49	4.34	6.05	10.63	[illegible]
110062A1	910920	17:20	27	89.0	1.12 a	16.71	4.39	5.45	1.15 b	11.66	8.94	12.04	23.65	7.78
110076A1	910923	07:15	11	87.0	0.94 b	6.29	2.72 b	4.09	2.29 b	9.32	6.02	10.38	18.28	4.44
110077A1	910923	08:00	16	86.0	0.93 b	4.40	3.47	5.07	3.52	5.34	6.40	8.01	15.59	5.18
110078A1	910927	07:45	19	94.5	5.80	2.20 b	0.50 a	2.40 b	1.80 a	12.00	8.00	6.60	30.00	49.00
110078A2	910927	07:45	19	94.5	4.40 b	4.50 b	1.80 a	2.10 b	1.80 a	10.00	5.70	6.70	23.00	40.00
110079A1	910927	08:15	10A	88.0	0.99 a	5.33	2.46 b	6.04	2.97 b	14.30	12.84	14.81	24.94	5.68
110080A1	910930	09:40	3	92.1	1.30 a	3.30 b	1.30 a	2.40 b	1.30 a	9.60	5.20	6.40	21.00	44.00
110081A1	910930	10:20	5	87.0	0.96 a	5.78	3.75	3.97	2.00 b	6.85	5.66	8.30	18.17	5.09
110082A1	910930	10:55	7	85.0	0.83 a	5.30	2.95	5.30	2.92	12.04	8.43	12.72	29.61	0.83 a
110083A1	910930	11:30	8	85.0	0.80 a	5.84	3.11	9.56	4.66	27.86	19.45	22.19	40.84	0.80 a
110083A2	910930	11:30	8	85.0	0.80 a	6.80	3.50	9.81	4.74	28.01	19.35	20.83	40.94	0.80 a
110084A1	910930	11:55	9	87.0	1.44 b	4.72	1.25 b	0.94 a	1.30 b	6.67	6.14	0.08 f	13.86	12.18
110063A1	910930	13:00	25	89.0	1.10 a	5.01	2.28 b	5.03	0.64 f	9.36	1.10 a	10.82	21.73	8.11
110075B1	911001	11:45	2	87.0	0.71 f	2.23 b	2.62 b	5.23	2.61 b	9.12	6.00	8.50	16.39	5.41
110064A1	911001	12:45	24	89.0	1.08 f	9.37	5.28	8.68	4.99	15.47	11.37	13.82	34.23	1.12 a
110085A1	911003	12:05	6	86.0	0.87 a	6.30	3.25	4.80	2.38 b	10.63	8.82	13.52	26.92	16.36
110086A1	911003	13:00	4	87.0	0.59 f	3.73	2.15 b	2.49 b	0.76 f	4.95	4.54	6.50	18.11	9.05
110087A1	911003	13:30	18	85.0	0.80 a	3.77	2.01 b	3.09	1.22 b	5.76	5.24	6.36	14.95	12.09
110088A1	911004	07:58	22	85.0	3.26	5.55	2.01 b	3.66	0.54 f	2.96	4.22	3.40	7.45	6.21
110089A1	911004	09:24	23	85.0	3.74	5.63	1.01 b	2.59	0.50 f	2.04 b	2.47 b	3.87	8.57	6.96
110060C1	911010	08:50	26	90.0	1.67 b	9.41	5.45	9.83	6.03	26.03	20.23	26.22	44.37	7.40
110090A1	911022	15:00	10	89.0	2.80	0.50 a	3.30 a	1.90 b	0.50 a	0.50 a	5.80	4.90	13.00	0.50 a
110090A2	911022	15:00	10	89.0	2.20 b	0.50 a	2.50 a	1.90 b	0.50 a	0.50 a	6.20	6.40	14.00	0.50 a
110092A1	911022	15:30	12A	90.0	1.13 b	4.08	0.98 a	2.90 b	2.18 b	9.70	6.28	0.98 a	23.49	9.66
110091A1	911022	16:00	12	90.0	0.99 a	2.87 b	0.99 a	2.73 b	2.06 b	14.68	12.50	10.49	76.76	8.44
110091A2	911022	16:00	12	90.0	0.99 a	3.77	0.99 a	2.50 b	1.50 b	21.67	16.69	0.99 a	96.60	20.28
110390A1	911217	07:30	1	91.0	1.36 a	3.50 b	0.71 f	2.26 b	0.84 f	1.36 a	1.50 b	4.14 b	10.60	3.33 b
110391A1	911217	09:30	12A	92.0	1.53 a	3.36 b	1.15 f	2.32 b	1.00 f	1.53 a	3.90 b	4.58 b	12.80	4.69 b
110392A1	911217	15:00	17	88.0	0.38 f	3.46	1.11 b	2.99 b	1.04 b	3.75	4.33	5.16	13.98	4.77
110393A1	911218	13:30	23	89.0	0.31 f	1.13 a	0.55 f	1.97 b	1.13 a	1.13 a	2.11 b	3.29 b	5.30	1.13 a
110394A1	911219	14:15	9	90.0	0.24 f	3.90 b	1.06 f	2.39 b	0.41 f	2.94 b	4.72	5.73	11.34	1.23 a
110395A1	911219	14:30	3	91.0	0.64 f	0.26 f	1.25 f	2.35 b	0.30 f	1.36 a	3.86 b	4.65	11.45	4.16 b
110396A1	911219	14:45	19	92.0	1.52 a	2.90 b	0.94 f	2.42 b	0.29 f	3.60 b	4.21 b	6.39	14.06	6.90
110396A2	911219	14:45	19	92.0	1.55 a	3.16 b	0.97 f	2.42 b	0.36 f	3.71 b	4.04 b	6.89	15.91	7.39
110397A1	911219	15:15	18	90.0	0.49 f	2.68 b	0.88 f	2.48 b	0.64 f	1.23 a	3.97 b	6.09	13.48	4.47
110398A1	920310	07:40	16	86.0	3.70	0.50 a	1.42 b	3.46 b	2.38 b	8.99	6.31	9.91	18.43	1.07 a
110399A1	920310	08:40	17	89.0	2.90 b	2.53 b	0.69 f	1.97 b	1.36 b	4.83	3.95	6.64	14.62	1.12 a
110400A1	920310	10:40	12A	88.0	4.03	0.29 f	1.08 b	2.19 b	1.68 b	5.56	4.06	6.58	16.60	8.48

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EPAID	CDATE	CTIME	STA	%H_2O	PCB138		PCB187		PCB128		PCB180		PCB170		PCB195		PCB206		PCB209		SUM
(H) MUSSEL (cont)																					
110074A1	910916	12:45	14	88.0	7.58		2.91	b	1.80	b	3.28	b	1.46	b	1.03	a	1.03	a	0.31	f	63.77
110062A1	910920	17:20	27	89.0	15.51		7.02		4.39		6.83		4.85		1.12	a	1.12	a	1.57	b	135.35
110076A1	910923	07:15	11	87.0	12.99		5.22		2.93	b	2.82	b	1.93	b	0.90	a	0.90	a	0.90	a	93.43
110077A1	910923	08:00	16	86.0	11.14		4.77		2.78	b	5.52		1.78	b	0.88	a	0.88	a	0.27	f	86.01
110078A1	910927	07:45	19	94.5	14.00		7.10		3.40	b	6.00		1.80	a	1.80	a	1.80	a	1.80	a	156.00
110078A2	910927	07:45	19	94.5	12.00		6.30		3.00	b	4.80	b	1.80	a	1.80	a	1.80	a	1.80	a	133.30
110079A1	910927	08:15	10A	88.0	21.25		5.54		6.23		4.61		1.25	b	0.99	a	0.99	a	0.99	a	132.28
110080A1	910930	09:40	3	92.1	11.00		5.40		2.30	b	3.20	b	1.30	a	1.30	a	1.30	a	1.30	a	122.90
110081A1	910930	10:20	5	87.0	11.26		6.06		2.99	b	3.77		0.96	a	0.96	a	0.96	a	0.96	a	88.50
110082A1	910930	10:55	7	85.0	18.83		11.33		4.55		7.02		3.27		0.83	a	0.83	a	0.83	a	128.50
110083A1	910930	11:30	8	85.0	26.94		13.55		8.44		11.02		4.06		0.80	a	0.80	a	0.80	a	201.59
110083A2	910930	11:30	8	85.0	26.07		13.31		7.80		10.08		3.15		0.80	a	0.80	a	0.80	a	198.48
110084A1	910930	11:55	9	87.0	9.63		0.65	f	2.61		3.70		0.94	a	0.94	a	0.94	a	0.94	a	69.01
110063A1	910930	13:00	25	89.0	13.69		5.96		3.32	b	3.46	b	1.10	a	1.10	a	1.10	a	0.57	f	95.54
110075B1	911001	11:45	2	87.0	10.91		4.97		3.22		4.01		0.93	a	0.93	a	0.93	a	0.20	f	84.99
110064A1	911001	12:45	24	89.0	19.77		10.12		5.65		11.08		7.37		5.20		4.47		1.57	b	170.72
110085A1	911003	12:05	6	86.0	15.74		10.00		5.65		4.84		1.29	b	0.87	a	0.87	a	0.43	f	133.62
110086A1	911003	13:00	4	87.0	9.26		5.87		2.45	b	4.57		0.96	a	0.96	a	0.96	a	0.96	a	78.94
110087A1	911003	13:30	18	85.0	10.47		4.88		2.48	b	3.28		0.80	a	0.80	a	0.80	a	0.80	a	79.70
110088A1	911004	07:58	22	85.0	2.59	b	2.35	b	0.96	f	2.45	b	0.80	a	0.80	a	0.80	a	0.80	a	50.90
110089A1	911004	09:24	23	85.0	3.48		2.53	b	1.71	b	2.93		0.78	a	0.78	a	0.78	a	0.78	a	51.24
110060C1	911010	08:50	26	90.0	29.98		11.44		7.93		19.35		5.44		1.24	a	1.24	a	0.95	f	234.30
110090A1	911022	15:00	10	89.0	9.60		4.50		2.30	b	3.00		0.50	a	0.50	a	0.50	a	0.50	a	55.10
110090A2	911022	15:00	10	89.0	11.00		5.20		2.70	b	4.00		0.50	a	0.50	a	0.50	a			59.60
110092A1	911022	15:30	12A	90.0	13.86		10.15		2.57		2.64	b	1.56	b	0.98	a	0.98	a	0.98	a	95.17
110091A1	911022	16:00	12	90.0	44.55		23.78		5.56		19.93		10.96		0.99	a	0.99	a	0.99	a	240.30
110091A2	911022	16:00	12	90.0	55.61		27.10		5.87		21.27		11.69		0.99	a	0.99	a	0.99	a	290.58
110390A1	911217	07:30	1	91.0	6.64		2.87	b	1.31	f	0.56	f	1.36	a	1.36	a	1.36	a	1.36	a	46.53
110391A1	911217	09:30	12A	92.0	8.05		4.88	b	1.76	b	1.53	a	1.53	a	1.53	a	1.53	a	1.53	a	59.25
110392A1	911217	15:00	17	88.0	9.16		4.72		2.36	b	1.03	a	1.03	a	1.03	a	1.03	a	1.03	a	62.43
110393A1	911218	13:30	23	89.0	3.95		1.26	b	0.89	f	1.13	a	1.13	a	1.13	a	1.13	a	1.13	a	29.85
110394A1	911219	14:15	9	90.0	7.80		3.31	b	2.11	b	1.23	a	0.11	f	1.23	a	1.23	a	1.23	a	52.32
110395A1	911219	14:30	3	91.0	8.00		3.84	b	2.26	b	1.36	a	1.36	a	1.36	a	1.36	a	1.36	a	51.27
110396A1	911219	14:45	19	92.0	9.77		4.49	b	2.80	b	3.83	b	1.52	a	1.52	a	1.52	a	1.52	a	70.27
110396A2	911219	14:45	19	92.0	10.05		4.73	b	2.21	b	3.48	b	1.55	a	1.55	a	1.55	a	1.55	a	73.15
110397A1	911219	15:15	18	90.0	9.03		4.13		2.26	b	1.23	a	1.23	a	1.23	a	1.23	a	1.23	a	58.07
110398A1	920310	07:40	16	86.0	11.83		5.41		3.06	b	8.90		1.07	a	1.07	a	1.07	a	0.60	f	89.25
110399A1	920310	08:40	17	89.0	9.13		4.70		2.38	b	5.19		1.60	b	1.12	a	1.12	a	0.12	f	66.07
110400A1	920310	10:40	12A	88.0	11.00		8.32		2.47	b	5.69		1.55	b	1.02	a	1.02	a	0.78	f	82.45

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB8	PCB18	PCB28	PCB52	PCB44	PCB66	PCB101	PCB118	PCB153	PCB105
(H) MUSSEL (cont)														
110401A1	920317	12:40	1	88.0	1.64 b	2.23 b	0.83 f	1.99 b	1.25 b	3.93	2.96 b	5.58	15.45	6.58
110402A1	920318	14:40	9	87.0	0.75 f	1.22 b	0.39 f	1.56 b	0.93 f	3.90	3.46 b	4.94	11.69	3.73 b
110403A1	920318	15:08	3	88.0	1.28 b	0.46 f	0.94 f	1.93 b	1.09 b	4.52	3.98	5.37	3.86	6.33
110404A1	920318	15:35	19	88.0	4.39	1.83 b	0.67 f	1.65 b	1.10 b	4.11	3.49	5.53	15.88	4.17
110405A1	920318	16:19	18	88.0	1.02 a	1.70 b	0.68 f	1.97 b	1.31 b	5.19	4.50	6.80	16.46	4.60
110405A2	920318	16:19	18	88.0	1.04 a	2.07 b	1.09 b	2.84 b	1.73 b	6.60	6.92	9.80	22.34	5.78
110406A1	920318	16:19	23	87.0	5.64	3.09 b	0.57 f	2.11 b	0.61 f	2.14 b	2.37 b	3.54	9.61	4.29
(I) OYSTER														
110060A1	910910	07:30	26	88.0	4.39	4.58	8.73	10.36	5.04	25.95	19.74	24.15	33.03	6.13
110065A1	911004	15:10	31	92.0	2.96 b	5.74	7.63	9.09	4.98	26.46	20.09	23.26	44.64	9.06
110066A1	911004	15:25	29	90.0	3.62 b	3.84 b	6.48	6.82	3.63 b	20.65	16.80	22.68	39.78	15.95
110061B1	911010	09:45	28	89.0	4.75	1.13 a	1.13 a	2.38 b	6.98	41.56	39.24	38.25	55.99	11.12
(J) POST DEPLOYMENT MUSSELS														
798951A1	911023		2	84.0	0.76 a	2.48 b	1.42 b	5.22	0.76 a	0.76 a	10.53	0.76 a	39.65	0.76 a
798952A1	911023		2	83.0	0.95 b	2.07 b	0.72 a	4.08	0.72 a	0.72 a	9.24	8.81	31.16	10.84
798953A1	911023		2	85.0	0.82 a	3.88	6.85	1.45 b	0.82 a	0.82 a	9.77	12.72	39.74	11.11
798955A1	911023		8	84.0	3.12	4.26	2.17 b	4.19	0.77 a	10.73	8.79	10.57	23.62	6.69
798956A1	911023		8	82.0	3.13 b	4.54	5.98	7.68	1.82 b	1.37 a	11.66	12.28	33.95	15.69
798956A2	911023		8	82.0	3.88 b	4.65	5.46	6.00	1.07 f	1.34 a	10.55	11.88	23.46	9.33
798957A1	911023		8	84.0	2.44 b	7.52	4.48	5.36	1.95 b	0.78 a	11.05	11.46	21.85	0.78 a
798963A1	911023		15	85.0	0.82 a	10.16	16.62	9.61	8.05	0.82 a	16.34	16.21	78.60	0.82 a
798964A1	911023		15	81.0	2.84	6.43	1.79 b	9.19	0.65 a	0.65 a	14.88	18.85	63.44	0.65 a
798965A1	911023		15	84.0	0.76 a	13.32	21.67	11.74	9.40	24.65	14.94	16.58	80.59	0.76 a
798967A1	911023		19	82.0	1.38 b	3.87	8.32	7.76	1.73 b	0.68 a	12.90	14.24	67.46	0.68 a
798968A1	911023		19	83.0	1.01 b	5.75	17.05	7.91	3.97	0.72 a	14.36	13.56	77.85	0.72 a
798969A1	911023		19	82.0	4.78	5.12	5.08	3.93	1.76 b	0.69 a	10.40	13.83	53.14	0.69 a
798971A1	911023		22	85.0	3.24	6.16	3.16	3.09	0.81 a	9.10	7.11	0.81 a	33.06	0.81 a
798972A1	911023		22	83.0	4.67 b	6.59	1.74 f	4.51 b	1.77 a	10.82	6.16	1.77 a	20.59	1.77 a
798972A2	911023		22	83.0	4.94 b	8.24	2.37 b	4.97 b	1.69 a	8.07	5.54 b	1.69 a	22.81	1.69 a
798973A1	911023		22	85.0	3.33 b	4.87 b	6.40 b	6.54 b	2.08 a	5.21 b	5.51 b	6.25 b	20.20	8.56
(K) PRE DEPLOYMENT MUSSELS														
798975A1	910918			85.0	0.83 a	1.92 b	1.08 b	2.91	1.16 b	6.36	7.66	10.18	19.89	8.73
798976A1	910918			86.0	1.17 a	3.21 b	2.23 b	3.61 b	4.40 b	9.85	6.50	7.57	16.08	9.33
798976A2	910918			86.0	1.14 a	2.78 b	2.11 b	3.43 b	4.76	12.22	7.29	9.45	19.23	10.64
798977A1	910918			84.0	1.02 a	1.02 a	7.03	5.16	2.32 b	11.18	9.17	14.42	24.02	11.33

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB138	PCB187	PCB128	PCB180	PCB170	PCB195	PCB206	PCB209	SUM
(H) MUSSEL (cont)													
110401A1	920317	12:40	1	88.0	8.56	4.55	2.57 b	3.37 b	0.53 f	1.04 a	0.05 f	2.05 b	65.23
110402A1	920318	14:40	9	87.0	3.17 a	3.75 b	2.29 b	4.13	3.17 a	3.17 a	0.53 f	0.84 f	53.69
110403A1	920318	15:08	3	88.0	8.06	4.56	2.65 b	3.50	1.02 a	1.02 a	0.65 f	0.16 f	51.49
110404A1	920318	15:35	19	88.0	9.63	4.63	2.65 b	4.63	1.41 b	1.03 a	0.20 f	0.68 f	67.74
110405A1	920318	16:19	18	88.0	10.36	5.18	2.76 b	4.97	0.94 f	1.02 a	1.02 a	1.02 a	71.56
110405A2	920318	16:19	18	88.0	13.38	5.07	3.53	6.19	2.67 b	1.04 a	1.04 a	1.04 a	94.22
110406A1	920318	16:19	23	87.0	5.12	2.80 b	1.75 b	2.06 b	0.96 a	0.96 a	0.96 a	0.19 f	48.84
(I) OYSTER													
110060A1	910910	07:30	26	88.0	22.22	8.89	4.26	17.22	5.78	1.04 a	1.04 a	0.71 f	203.33
110065A1	911004	15:10	31	92.0	25.68	14.37	5.84	4.76 b	5.43	1.54 a	1.54 a	0.59 f	213.75
110066A1	911004	15:25	29	90.0	22.51	12.93	4.30	5.15	1.23 a	1.23 a	1.23 a	0.56 f	189.47
110061B1	911010	09:45	28	89.0	1.26 b	18.07	6.32	11.94	2.81 b	1.13 a	1.13 a	0.76 f	246.01
(J) POST DEPLOYMENT MUSSELS													
798951A1	911023		2	84.0	7.12	0.76 a	5.85	0.76 a	0.76 a	0.54 f	0.76 a	0.76 a	80.52
798952A1	911023		2	83.0	8.46	0.72 a	2.74	3.89	0.72 a	0.72 a	0.72 a	0.72 a	88.10
798953A1	911023		2	85.0	6.71	0.82 a	5.90	7.37	4.89	0.82 a	0.82 a	0.82 a	116.20
798955A1	911023		8	84.0	7.50	2.24 b	3.92	4.85	3.34	0.63 f	0.77 a	0.77 a	99.01
798956A1	911023		8	82.0	11.22	4.49 b	5.00	5.79	6.15	1.37 a	1.37 a	1.37 a	134.92
798956A2	911023		8	82.0	10.61	4.27 b	6.42	5.71	4.69	1.34 a	1.34 a	1.34 a	113.43
798957A1	911023		8	84.0	12.70	4.92	5.22	7.87	2.70	0.78 a	3.14	0.25 f	105.32
798963A1	911023		15	85.0	15.75	5.33	6.84	8.89	0.82 a	0.82 a	4.01	0.82 a	201.42
798964A1	911023		15	81.0	0.65 a	4.47	3.56	7.31	2.99	0.65 a	0.65 a	0.65 a	140.40
798965A1	911023		15	84.0	19.09	4.53	3.22	9.38	0.76 a	0.76 a	4.92	0.76 a	237.89
798967A1	911023		19	82.0	15.01	5.99	6.06	8.76	0.68 a	0.68 a	1.25 b	0.68 a	158.18
798968A1	911023		19	83.0	15.38	5.05	2.69	8.21	2.94	0.23 f	0.72 a	0.72 a	178.95
798969A1	911023		19	82.0	11.17	2.59	1.70 b	4.79	0.69 a	0.69 a	1.42 b	0.69 a	123.24
798971A1	911023		22	85.0	0.81 a	2.51 b	2.13 b	6.31	4.45	0.81 a	6.42	0.27 f	91.16
798972A1	911023		22	83.0	1.77 a	2.64 b	2.80 b	3.39 b	5.99	1.77 a	1.77 a	1.77 a	82.36
798972A2	911023		22	83.0	1.69 a	2.46 b	2.86 b	3.44 b	3.00 b	1.69 a	1.69 a	1.69 a	80.58
798973A1	911023		22	85.0	8.09	3.15 b	10.70	5.70 b	7.97	2.08 a	2.08 a	0.70 f	109.49
(K) PRE DEPLOYMENT MUSSELS													
798975A1	910918			85.0	9.98	4.74	4.19	0.81 f	0.83 a	0.83 a	4.50	0.55 f	87.26
798976A1	910918			86.0	7.90	3.54 b	2.29 b	0.74 f	1.18 b	0.34 f	1.17 a	1.15 f	82.33
798976A2	910918			86.0	9.69	4.34	2.60 b	0.53 f	1.21 b	0.25 f	1.14 a	1.45 b	94.33
798977A1	910918			84.0	11.37	7.49	14.72	1.02 a	7.10	1.02 a	1.02 a	1.02 a	131.47

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EPAID	CDATE	CTIME	STA	%H_2O	PCB8	PCB18	PCB28	PCB52	PCB44	PCB66	PCB101	PCB118	PCB153	PCB105
(L) SEDIMENT CORE														
110015A1	910916	10:40	15	47.0	0.50 a	0.70 b	7.69	3.85	6.15	9.74	4.75	0.81 b	7.68	0.50 a
110015B1	910916	10:40	15	42.0	1.09 b	0.50 a	0.50 a	2.05	0.50 a	3.38	2.43	0.50 a	2.33	0.50 a
110015C1	910916	10:40	15	56.0	0.50 a	0.50 a	0.41 f	0.32 f	0.35 f	3.17	2.07	2.30	7.74	0.89 b
110015D1	910916	10:40	15	54.0	0.35 f	1.47 b	0.75 b	0.31 f	0.50 a	0.50 a	0.16 f	0.50 f	0.50 a	0.77 b
110017A1	910916	11:30	17	44.0	0.50 a	0.57 b	0.24 f	0.18 f	0.50 a	0.99 b	0.25 f	0.62 b	1.04 b	0.82 b
110017B1	910916	11:30	17	53.0	0.50 a	0.50 a	1.94	0.28 f	0.50 a	1.55 b	0.50 a	0.62 b	0.50 a	0.50 a
110017C1	910916	11:30	17	50.0	0.50 a	0.14 f	0.69 b	0.50 a	0.50 a	0.44 f	0.20 f	0.50 a	3.15	0.99 b
110014A1	910916	12:30	14	28.0	0.50 a	0.50 a	0.50 b	0.42 f	0.50 a	0.76 b	0.94 b	0.50 a	0.50 a	0.65 b
110014B1	910916	12:30	14	33.0	1.18 b	1.33 b	1.11 b	0.73 b	0.72 b	0.50 a	0.89 b	0.50 a	0.50 a	1.26 b
110014C1	910916	12:30	14	32.0	0.50 a	0.24 f	0.06 f	0.50 a	0.50 a	0.07 f	0.06 f	0.50 a	0.15 f	0.19 f
110019A1	910916	14:00	19	53.0	0.50 a	0.50 a	0.82 b	0.87 b	0.60 b	1.76	0.25 f	1.03 b	1.61 b	0.42 f
110019A2	910916	14:00	19	53.0	0.50 a	0.50 a	1.04 b	0.69 b	0.16 f	1.66	0.40 f	0.92 b	2.74	0.98 b
110019B1	910916	14:00	19	56.0	0.50 a	0.50 a	1.42 b	0.85 b	0.50 a	4.22	1.19 b	1.98	7.27	0.50 a
110019C1	910916	14:00	19	51.0	0.50 a	3.50	4.00	1.32 b	0.50 a	8.27	0.44 f	0.50 a	7.84	2.62
110004A1	910916	14:30	4	67.0	0.12 f	0.76 b	0.47 f	0.65 b	0.48 f	0.50 a	1.08 b	1.40 b	2.68	1.21 b
110004B1	910916	14:30	4	65.0	0.50 a	1.64 b	0.63 b	1.68	0.96 b	0.50 a	2.17	2.40	4.98	2.41
110003A1	910918	10:30	3	48.0	0.13 f	0.53 b	1.00 b	0.35 f	0.25 f	0.50 a	0.42 f	0.75 b	1.25 b	0.60 b
110003B1	910918	10:30	3	47.0	0.13 f	0.50 a	1.62 b	0.53 b	0.13 f	0.50 a	0.77 b	0.50 a	8.45	0.75 b
110005A1	910918	11:10	5	60.0	2.00	3.73	3.39	0.74 b	0.34 f	0.50 a	2.06	2.68	5.77	2.91
110005B1	910918	11:10	5	63.0	0.72 b	1.26 b	0.99 b	1.27 b	1.81	0.50 a	2.29	2.33	5.98	2.43
110005C1	910918	11:10	5	66.0	10.30	2.26	4.97	3.05	7.12	12.41	4.56	5.83	11.03	5.08
110007A1	910918	11:30	7	65.0	1.42 b	1.35 b	2.19	1.56 b	1.45 b	0.50 a	1.79	2.14	4.41	2.09
110007B1	910918	11:30	7	56.0	2.37	1.33 b	1.37 b	4.10	2.99	10.09	7.43	0.50 a	8.93	4.28
110007C1	910918	11:30	7	22.0	0.10 f	0.22 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.26 f
110008A1	910918	12:00	8	59.0	0.85 b	0.97 b	1.92	1.34 b	1.46 b	0.50 a	2.57	2.71	6.11	2.09
110008B1	910918	12:00	8	61.0	42.65	1.09 b	18.34	1.77	6.38	10.84	4.45	3.20	7.63	4.09
110006A1	910918	12:30	6	64.0	0.55 b	0.88 b	0.61 b	0.90 b	0.70 b	2.41	1.64 b	1.91	3.89	1.75
110006B1	910918	12:30	6	24.0	0.02 f	0.02 f	0.50 a	0.02 f	0.02 f	0.02 f	0.05 f	0.50 a	0.50 a	0.18 f
110006B2	910918	12:30	6	24.0	0.03 f	0.03 f	0.02 f	0.02 f	0.01 f	0.03 f	0.05 f	0.50 a	0.04 f	0.13 f
110001A1	910919	09:45	1	28.0	0.17 f	2.00	0.80 b	0.45 f	0.50 a	0.50 a	0.25 b	0.34 f	0.84 f	0.56 b
110001B1	910919	09:45	1	31.0	0.76 b	1.06 b	1.65	0.50 b	0.24 f	0.50 a	0.41 f	0.51 b	2.01	0.81 b
110010A1	910926	10:00	10	51.0	2.62	1.75	5.28	1.51 b	0.72 b	3.77	1.50 b	1.71	2.67	0.99 b
110010B1	910926	10:00	10	54.0	4.63	1.37 b	7.09	2.92	2.30	0.50 a	4.40	4.22	17.72	0.50 a
110010C1	910926	10:00	10	51.0	0.64 b	0.60 b	0.69 b	1.24 b	1.08 b	0.50 a	1.97	1.60	5.16	0.83 b
110010D1	910926	10:00	10	53.0	10.58	3.25	7.62	2.72	0.50 a	5.81	3.68	3.86	13.99	0.50 a
110010E1	910926	10:00	10	45.0	3.09	2.88	7.45	7.07	5.01	12.96	10.52	34.01	7.02	19.48
110012A1	910926	11:00	12	36.0	2.60	1.60 b	1.35 b	1.11 b	1.07 b	4.68	3.52	2.81	6.70	1.76
110012B1	910926	11:00	12	36.0	1.19 b	0.50 a	2.09	2.45	2.15	0.50 a	4.26	4.25	9.26	2.29
110012C1	910926	11:00	12	53.0	0.50 a	0.32 f	1.39 b	1.29 b	0.50 a	0.50 a	0.50 a	7.78	0.50 a	4.61

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB138	PCB187	PCB128	PCB180	PCB170	PCB195	PCB206	PCB209	SUM
(L) SEDIMENT CORE													
110015A1	910916	10:40	15	47.0	9.45	0.50 a	0.48 b	1.04 b	2.94	3.69 a	28.01	9.66	98.21
110015B1	910916	10:40	15	42.0	3.49	1.35 b	0.93	0.51 b	0.50 a	0.50 a	0.50 a	0.50 a	22.09
110015C1	910916	10:40	15	56.0	3.29	1.47 b	0.51 b	2.35	2.77	1.73 a	2.81	2.77	36.02
110015D1	910916	10:40	15	54.0	0.50 a	0.21 f	0.21 f	1.80	0.50 a	0.50 a	0.50 a	0.50 a	10.56
110017A1	910916	11:30	17	44.0	1.58 b	0.63 b	0.62 b	1.30 b	0.50 a	0.57 a	0.50 a	1.49 b	12.97
110017B1	910916	11:30	17	53.0	0.50 a	0.49 f	2.28	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	13.18
110017C1	910916	11:30	17	50.0	1.96	1.51 b	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	14.11
110014A1	910916	12:30	14	28.0	0.50 a	0.50 a	1.57 b	2.09	7.16	6.69	44.43	0.50 a	69.26
110014B1	910916	12:30	14	33.0	1.13 b	0.69 b	1.31 b	0.50 a	12.59	11.19	36.83	21.84	94.85
110014C1	910916	12:30	14	32.0	1.34 b	0.10 f	0.05 f	0.50 a	0.87 b	0.50 a	2.08	2.00	10.27
110019A1	910916	14:00	19	53.0	5.30	0.64 b	0.37 f	0.67 b	0.50 a	0.50 a	0.50 a	0.72 b	17.61
110019A2	910916	14:00	19	53.0	5.60	0.85 b	0.68 b	0.22 f	0.50 a	0.50 a	5.10	4.09	27.18
110019B1	910916	14:00	19	56.0	8.32	2.35	0.58 b	3.92	3.53	1.93 a	0.13 f	1.54 b	41.28
110019C1	910916	14:00	19	51.0	3.03	2.91	0.50 a	0.50 a	6.90	4.14 a	8.13	8.14	63.78
110004A1	910916	14:30	4	67.0	1.51 b	0.52 b	0.44 f	0.59 b	1.99	0.50 a	16.77	0.50 a	32.24
110004B1	910916	14:30	4	65.0	3.40	1.41 b	1.30 b	1.88	1.77	0.50 a	17.36	0.91 b	46.46
110003A1	910918	10:30	3	48.0	1.16 b	0.53 b	0.83 b	0.61 b	1.17	0.76 b	10.88	0.97 b	22.76
110003B1	910918	10:30	3	47.0	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	2.06	18.53	0.50 a	37.51
110005A1	910918	11:10	5	60.0	3.37	1.35 b	1.58 b	2.80	1.18 b	0.50 a	14.83	1.80	51.61
110005B1	910918	11:10	5	63.0	3.68	1.80	1.35 b	4.08	1.62 b	0.50 a	16.62	0.97 b	50.27
110005C1	910918	11:10	5	66.0	11.10	3.12	5.98	5.39	7.54	4.44	64.90	17.98	187.14
110007A1	910918	11:30	7	65.0	3.05	1.35 b	0.88 b	1.37 b	1.78	1.51 b	17.14	0.84 b	46.88
110007B1	910918	11:30	7	56.0	16.42	0.50 a	40.80	10.14	6.16	2.33	29.40	0.50 a	149.70
110007C1	910918	11:30	7	22.0	0.50 a	0.50 a	0.50 a	0.50 a	0.49 f	0.50 a	10.17	0.50 a	17.76
110008A1	910918	12:00	8	59.0	4.06	2.03	1.66	0.50 a	3.19	0.50 a	17.04	2.00	51.57
110008B1	910918	12:00	8	61.0	10.21	3.69	1.76	4.65	3.54	1.32 b	10.25	3.77	139.69
110006A1	910918	12:30	6	64.0	2.45	0.98 b	0.85 b	0.96 b	1.20 b	0.73 b	19.68	1.87	44.05
110006B1	910918	12:30	6	24.0	0.03 f	0.50 a	0.08 f	0.24 f	0.72 b	0.51 b	4.15	0.87 b	8.99
110006B2	910918	12:30	6	24.0	0.04 f	0.50 a	0.05 f	0.17 f	0.53 b	0.41 f	5.23	0.82 b	8.68
110001A1	910919	09:45	1	28.0	1.60 b	0.13 f	0.36 f	0.50 a	0.06 f	0.50 a	9.05	0.50 a	19.16
110001B1	910919	09:45	1	31.0	6.35	0.31 f	0.52 b	0.50 a	0.20 f	0.50 a	8.31	0.68 b	25.89
110010A1	910926	10:00	10	51.0	4.78	0.50 a	0.50 a	0.50 a	1.50 b	0.50 a	15.64	0.50 a	46.99
110010B1	910926	10:00	10	54.0	9.46	8.55	5.64	9.22	4.60	0.50 a	48.88	6.11	138.68
110010C1	910926	10:00	10	51.0	2.15	1.87	0.89 b	1.39 b	1.86	0.50 a	36.05	4.02	63.12
110010D1	910926	10:00	10	53.0	6.35	1.64 b	1.08 b	0.50 a	3.89	0.50 a	18.75	0.50 a	85.78
110010E1	910926	10:00	10	45.0	19.48	8.29	6.13	11.17	9.91	2.77	27.71	0.50 a	195.52
110012A1	910926	11:00	12	36.0	3.79	2.17	8.87	6.19	10.05	8.82	91.56	15.03	173.76
110012B1	910926	11:00	12	36.0	5.97	2.26	2.30	3.32	2.09	0.50 a	12.09	1.05 b	58.58
110012C1	910926	11:00	12	53.0	11.10	4.68	3.37	5.96	4.50	1.90	5.63	7.12	62.20

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB8	PCB18	PCB28	PCB52	PCB44	PCB66	PCB101	PCB118	PCB153	PCB105
(L) SEDIMENT CORE (cont)														
110012C2	910926	11:00	12	53.0	4.13	0.50 a	13.39	6.17	0.50 a	0.50 a	0.50 a	8.94	20.68	5.92
110021A1	911115	11:00	21	43.0	4.81	1.42 b	1.61 b	0.91 b	1.17 b	2.63	0.79 b	1.14 b	2.65	2.30
110021B1	911115	11:00	21	39.0	0.50 a	1.20 b	1.67	0.52 b	0.24 f	1.56 b	0.40 a	0.38 a	0.75 b	2.32
110021B2	911115	11:00	21	39.0	0.50 a	1.26 b	1.61 b	0.90 b	1.04 b	1.75	0.64 b	0.74 b	0.71 b	2.06
110021C1	911115	11:00	21	38.0	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a
110021D1	911115	11:00	21	30.0	4.78	0.50 a	0.89 b	0.50 a	1.13 b	0.50 a	0.50 a	0.50 a	0.50 a	1.57 b
(M) SEDIMENT GRAB														
110210B1	910909	14:09	19	52.0	0.50 a	2.00 a	0.50 a	0.60 b	0.50 a	2.50	0.50 a	0.80 b	2.30	0.50 a
110210D1	910909	14:45	19	51.0	0.50 b	2.00 a	0.60 b	0.60 b	0.50 a	0.50 a	1.80	1.10 b	6.70	0.50 a
110210E1	910909	15:00	19	51.0	0.50 a	2.00 a	0.50 a	0.50 a	0.50 a	1.70	0.50 b	0.80 b	3.60	0.50 a
110210F1	910909	15:08	19	48.0	0.50 a	2.00 a	0.50 a	0.50 a	0.50 a	1.70	0.50 a	0.70 b	2.00	0.50 a
110211C1	910909	16:05	18	5.0	0.44 f	0.48 f	0.49 f	1.64 b	0.63 b	1.53 b	0.77 b	0.68 b	3.30	1.21 b
110211C2	910909	16:05	18	5.0	0.48 f	0.43 f	0.47 f	2.21	0.36 f	1.22 b	0.76 b	0.62 b	1.59 b	0.79 b
110213C1	910910	08:30	21	28.0	0.50 a	0.29 f	0.23 f	0.48 f	0.17 f	0.88 b	0.33 f	0.63 b	1.34 b	1.36 b
110212C1	910910	10:30	16	24.0	0.09 f	0.14 f	0.22 f	0.24 f	0.17 f	0.53 b	0.31 f	0.29 f	0.59 b	1.15 b
110215C1	910910	11:35	15	51.0	1.05 b	2.11	2.25	1.98	1.91	3.94	1.80	2.33	3.37	3.76
110214C1	910910	12:45	14	11.0	0.21 f	1.01 b	1.32 b	1.49 b	1.30 b	2.47	1.01 b	1.05 b	1.08 b	5.23
110216C1	910910	14:15	11	38.0	0.51 b	0.88 b	0.52 b	0.56 b	0.40 f	1.25 b	0.50 b	0.76 b	1.09 b	0.36 f
110217B1	910910	15:25	17	41.0	0.50 a	2.00 a	0.50 a	0.50 a	0.50 a	1.40 b	0.50 a	0.50 b	1.90	0.50 a
110217D1	910910	15:40	17	39.0	0.50 a	2.00 a	0.50 a	0.50 a	0.50 a	1.70	0.50 b	0.90 b	2.10	0.50 a
110217E1	910910	15:55	17	41.0	0.50 a	2.00 a	0.60 b	0.50 a	0.50 a	2.00	0.50 a	0.80 b	9.20	2.10
110217F1	910910	16:10	17	47.0	0.50 a	2.00 a	0.60 b	0.60 b	0.50 a	2.50	0.70 b	0.90 b	1.60	0.50 a
110218C1	910911	10:55	12	35.0	0.60 b	0.84 b	0.75 b	1.82	2.88	4.17	2.88	2.87	5.88	1.80
110219C1	910911	12:30	13	45.0	0.82 b	0.58 b	0.86 b	0.85 b	0.92 b	1.81 b	1.04 b	1.19 b	3.06	2.03
110220B1	910911	13:45	10	55.0	0.70 b	2.00 a	1.50 b	1.30 b	1.00 b	5.40	2.30	1.90	4.40	1.10 b
110220B2	910911	13:45	10	55.0	0.50 a	2.00 a	1.60	1.30 b	1.10 b	4.50	2.20	1.70	5.40	1.40 b
110220D1	910911	13:55	10	60.0	0.70 b	0.90 b	1.20 b	1.20 b	0.80 b	3.50	1.70 b	1.60 b	3.60	1.70 b
110220E1	910911	14:07	10	52.0	0.50 a	2.00 a	0.90 b	1.00 b	0.60 b	3.20	1.60	1.20 b	3.30	0.80 b
110220F1	910911	14:12	10	58.0	0.60 a	1.70 b	1.40 b	1.20 b	0.70 b	4.00	1.90	1.20 b	2.60	0.60 a
110222C1	910911	16:55	4	61.0	0.61 f	0.53 f	0.78 b	1.36 b	0.68 b	0.96 b	1.58 b	1.69	3.31	1.67
110223C1	910912	09:55	20	22.0	0.00 f	0.22 f	0.12 f	0.17 f	0.09 f	0.50 a	0.11 f	0.21 f	0.33 f	0.50 a
110232C1	910912	10:05	5	45.0	0.66 b	1.13 b	1.27 b	1.27 b	0.99 b	0.95 b	1.03 b	1.38 b	2.52	0.99 b
110225B1	910912	14:05	8	69.0	1.00 b	1.60 b	2.80	1.40 b	1.20 b	1.80 b	2.90	3.20	6.00	3.50
110225D1	910912	14:20	8	61.0	0.60 a	0.60 a	0.90 b	0.80 b	0.60 a	3.10	1.40 b	1.70 b	3.30	0.60 a
110225E1	910912	14:35	8	65.0	0.70 a	2.80 a	1.00 b	1.10 b	0.70 a	5.20	2.40	1.80 b	4.30	0.70 a
110225F1	910912	14:50	8	59.0	1.40 b	0.60 a	0.60 b	1.10	0.80 b	3.60	1.50 b	1.60 b	3.46	2.80
110226B1	910912	15:05	7	68.0	0.80	3.10	1.80 b	1.80 b	1.30 b	0.80 b	3.40	3.30	13.00	10.00
110226D1	910912	15:20	7	66.0	0.80 b	2.90 a	1.90 b	1.80 b	0.90 b	5.70	2.90	3.20	5.10	2.40

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB138	PCB187	PCB128	PCB180	PCB170	PCB195	PCB206	PCB209	SUM
(L) SEDIMENT CORE (cont)													
110012C2	910926	11:00	12	53.0	16.25	4.44	3.53	7.09	4.40	0.50 a	7.07	8.91	113.48
110021A1	911115	11:00	21	43.0	2.45	1.73	1.15 b	0.73 b	0.81 b	0.50 a	8.99	2.24	38.09
110021B1	911115	11:00	21	39.0	0.35 f	0.26 f	0.40 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	13.11
110021B2	911115	11:00	21	39.0	1.42 b	0.32 f	0.23 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	15.71
110021C1	911115	11:00	21	38.0	0.50 a	0.41 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	8.91
110021D1	911115	11:00	21	30.0	0.56 b	0.20 f	0.05 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	14.71
(M) SEDIMENT GRAB													
110210B1	910909	14:09	19	52.0	1.90	0.50 a	0.50 b	0.60 b	0.60 b	0.50 a	0.50 a	0.50 a	16.30
110210D1	910909	14:45	19	51.0	4.80	2.90	1.20 b	3.80	3.00	0.60 b	0.70 b	0.50 a	32.30
110210E1	910909	15:00	19	51.0	0.50 a	1.30 b	0.50 a	1.80	1.70	0.50 a	0.50 a	0.50 a	18.40
110210F1	910909	15:08	19	48.0	1.60	0.80 b	0.60 b	0.80 b	0.80 b	0.50 a	0.50 a	0.50 a	15.50
110211C1	910909	16:05	18	5.0	2.52	2.36	0.57 b	5.42	4.35	0.95 b	1.21 b	0.44 f	29.09
110211C2	910909	16:05	18	5.0	1.28 b	0.93 b	0.44 f	1.32 b	0.50 a	0.50 a	1.03 b	0.49 f	15.48
110213C1	910910	08:30	21	28.0	1.06 b	0.51 b	0.49 f	0.05 f	0.44 f	0.50 a	0.71 b	0.27 f	10.32
110212C1	910910	10:30	16	24.0	0.41 f	0.26 f	0.20 f	0.07 f	0.26 f	0.50 a	0.28 f	0.16 f	5.94
110215C1	910910	11:35	15	51.0	2.98	1.68	0.94 b	1.27 b	0.88 b	0.66 b	1.08 b	0.40 f	34.46
110214C1	910910	12:45	14	11.0	1.02 b	0.46 f	0.39 f	0.18 f	0.39 f	0.26 f	0.50 a	0.37 f	19.80
110216C1	910910	14:15	11	38.0	0.92 b	0.78 b	0.52 b	0.50 a	0.56 b	0.38 f	0.72 b	0.30 f	11.56
110217B1	910910	15:25	17	41.0	1.20 b	0.50 a	0.60 b	0.80 b	0.50 b	0.50 a	0.50 a	0.50 a	13.90
110217D1	910910	15:40	17	39.0	1.60	0.90 b	0.50 a	0.90 b	0.60 b	0.50 a	2.10	0.50 b	17.30
110217E1	910910	15:55	17	41.0	1.80	4.10	1.20 b	0.50 a	1.10 b	0.50 a	0.50 a	1.00 b	29.40
110217F1	910910	16:10	17	47.0	1.40 b	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.80 b	15.60
110218C1	910911	10:55	12	35.0	5.02	2.19	2.23	3.12	2.26	0.50 a	1.97	1.29 b	43.14
110219C1	910911	12:30	13	45.0	2.13	1.80 b	0.65 b	1.39 b	1.50 b	0.63 b	2.95	0.68 b	24.96
110220B1	910911	13:45	10	55.0	3.40	1.40 b	0.80 b	1.60 b	1.50 b	0.50 a	0.60 b	0.50 a	31.90
110220B2	910911	13:45	10	55.0	4.50	2.20	1.20 b	2.40	2.60	0.50 a	0.80 b	1.00 b	36.90
110220D1	910911	13:55	10	60.0	2.80	2.10	0.90 b	2.00	1.20 b	0.60 b	1.80	0.60 b	28.90
110220E1	910911	14:07	10	52.0	2.60	1.00 b	0.50 a	1.20 b	1.20 b	0.50	0.60 b	0.80 b	23.50
110220F1	910911	14:12	10	58.0	2.30	0.90 b	0.80 b	1.30 b	2.50	0.60 a	0.60 a	0.60 a	25.50
110222C1	910911	16:55	4	61.0	2.65	1.76	1.00 b	1.01 b	1.12 b	0.62 a	0.70 b	0.97 b	23.09
110223C1	910912	09:55	20	22.0	0.29 f	0.50 a	0.25 f	0.50 a	0.50 a	0.13 f	0.50 a	0.13 f	5.10
110232C1	910912	10:05	5	45.0	2.11	1.65	0.75 b	1.01 b	0.85 b	0.50 a	2.42	0.78 b	22.35
110225B1	910912	14:05	8	69.0	4.80	2.80	1.70 b	2.50	2.00 b	1.90 b	2.70	2.00 b	45.80
110225D1	910912	14:20	8	61.0	2.80	1.10 b	0.60 a	1.10 b	1.20 b	0.60 a	1.10 b	0.60 a	22.70
110225E1	910912	14:35	8	65.0	3.70	2.30	0.90 b	1.90 b	2.80	1.10 b	2.20	0.70 a	36.30
110225F1	910912	14:50	8	59.0	2.80	1.30 b	0.90 b	1.50 b	0.60 a	1.30 b	1.60 b	0.70 b	28.16
110226B1	910912	15:05	7	68.0	8.30	15.00	6.10	15.00	4.80	3.40	3.20	0.80 a	95.90
110226D1	910912	15:20	7	66.0	3.90	2.50	2.60	2.90	2.60	0.70	2.10	1.80 b	46.70

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB8		PCB18		PCB28		PCB52		PCB44		PCB66		PCB101		PCB118		PCB153		PCB105	
(M) SEDIMENT GRAB (cont)																								
110226D2	910912	15:20	7	66.0	0.70	a	2.90	a	2.20		2.00	b	1.00	b	7.60		2.60		3.80		5.90		2.20	
110226E1	910912	15:35	7	64.0	0.70	a	2.80	a	2.40		1.70	b	1.30	b	0.70	a	2.40		2.90		5.70		0.70	a
110226F1	910912	15:50	7	63.0	0.60	a	2.60	a	1.40	b	1.20	b	0.80	b	5.30		1.80		2.40		5.40		0.60	a
110227C1	910913	12:35	23	29.0	0.15	f	0.21	f	0.12	f	0.19	f	0.06	f	0.17	f	0.07	f	0.13	f	0.18	f	0.93	b
110228C1	910913	13:50	22	27.0	0.50	a	0.10	f	0.10	f	0.28	f	0.09	f	0.33	f	0.28	f	0.29	f	0.32	f	1.20	b
110229C1	910916	10:05	9	36.0	1.90		0.76	b	0.50	a	0.50	a	1.25	b	2.74		1.07	b	1.41	b	2.08		1.43	b
110230C1	910916	11:20	2	52.0	1.06	b	2.13		3.79		1.58	b	1.08	b	3.63		1.19	b	1.53	b	2.31		1.66	
110221C1	910916	12:15	1	30.0	0.50	a	0.14	f	0.13	f	0.39	f	0.09	f	0.68	b	0.57	b	0.48	f	0.83	b	1.12	b
(N) SEEP																								
112327A1	920213	12:15	S3		0.50	a	0.00	f	0.01	f	0.50	a	0.00	f	0.00	f	0.50	a	0.50	a	0.50	a	0.50	a
112326A1	920213	12:20	S2		0.00	f	0.01	f	0.01	f	0.50	a	0.50	a	0.01	f	0.50	f	0.50	a	0.50	a	0.50	a
112325A1	920213	12:30	S1		0.50	a	0.02	f	0.02	f	0.00	f	0.50	a	0.50	a	0.50	a	0.50	a	0.50	a	0.50	a
112325B1	920213	12:30	S1		0.50	a	0.01	f	0.02	f	0.00	f	0.50	a	0.00	a	0.50	a	0.50	a	0.50	a	0.50	a
112325B2	920213	12:30	S1		0.60	a	0.00	f	0.01	f	0.01	f	0.60	a	0.60	a	0.00	f	0.60	a	0.60	a	0.60	a

(Contd)

EPAID	CDATE	CTIME	STA	%H_2O	PCB138	PCB187	PCB128	PCB180	PCB170	PCB195	PCB206	PCB209	SUM
(M) SEDIMENT GRAB (cont)													
110226D2	910912	15:20	7	66.0	4.20	2.60	2.00 b	2.20	3.50	0.70 a	2.30	2.50	50.90
110226E1	910912	15:35	7	64.0	5.00	2.50	1.40 b	2.10 b	1.90 b	1.20 b	2.20	1.50 b	39.10
110226F1	910912	15:50	7	63.0	4.80	2.00	1.50 b	2.10	2.10	1.80	3.50	2.50	42.40
110227C1	910913	12:35	23	29.0	0.14 f	0.50 a	0.06 f	0.50 a	0.28 f	0.09 f	0.06 f	0.07 f	3.97
110228C1	910913	13:50	22	27.0	0.26 f	0.50 a	0.33 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	7.13
110229C1	910916	10:05	9	36.0	2.79	1.93	1.88	0.50 a	0.71 b	0.50 a	1.70	1.44 b	25.15
110230C1	910916	11:20	2	52.0	1.99	0.83 b	0.57 b	0.93 b	0.47 f	0.50 a	1.59 b	0.93 b	27.83
110221C1	910916	12:15	1	30.0	0.73 b	0.27 f	0.18 f	0.50 a	0.12 f	0.50 a	0.50 a	0.38 f	8.16
(N) SEEP													
112327A1	920213	12:15	S3		0.20 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.00 f	6.23
112326A1	920213	12:20	S2		0.06 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.00 f	6.11
112325A1	920213	12:30	S1		0.04 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	7.10
112325B1	920213	12:30	S1		0.05 f	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	0.50 a	6.61
112325B2	920213	12:30	S1		0.06 f	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	7.89

4. PESTICIDE COMPOUNDS

VARIABLE	DESCRIPTION	VARIABLE	DESCRIPTION
%H_20	Percent moisture	%H_20	Percent moisture
ALDRIN	Aldrin	DDDOP	o,p′–DDD
ACHLOR	Alpha–chlordane	DDDPP	p,p′–DDD
TNONACHL	Trans–nonachlor	DDEOP	o,p′–DDE
HEPCHLOR	Heptachlor	DDEPP	p,p′–DDE
HEPEPX	Heptachlor epoxide	DDTOP	o,p′–DDT
HCB	Hexachlorobenzene	DDTPP	o,p′–DDT
LINDANE	Lindane (gamma–BHC)	SUM	Sum of pesticides
MIREX	Mirex		

DATA QUALIFIER CODES:

a	Analyte was not detected below the method detection limit (MDL) shown.
b	Reported value was below the limit of quantification (LOQ).
c	Not reported due to matrix interference.
d	Not quantified.
e	Not reported.
f	Reported value was below the MDL.
h	Quantification was based on alternate internal standard.
j	Analysis was performed with selected ion monitoring.
p	Value shown may be biased because recovery of the analyte in reference material was outside the desired range.
u	Analyte was not detected at the instrument detection limit.

PESTICIDE CONCENTRATIONS (ug/Kg) and DATA FLAGS

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
(A) EELGRASS LEAVES														
110042	A	1	910916	13:30	3	15	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	2.40 a	0.60 a	0.60 a
110042	A	2	910916	13:30	3	15	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	2.40 a	0.60 a	0.60 a
110044	A	1	910917	14:30	19	10	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	2.40 a	0.60 a	0.60 a
110053	A	1	911022	16:30	12A	10	0.70 a	0.80 b	0.70 a	1.00 b	0.70 a	2.70 a	0.70 a	0.70 a
110053	A	2	911022	16:30	12A	10	0.70 a	0.80 b	0.90 b	0.70 a	0.70 a	2.70 a	0.70 a	0.70 a
(B) EELGRASSROOTS														
110042	C	1	910916	13:30	3	12	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	3.20 b	0.60 a	0.60 a
110044	C	1	910917	14:30	19	10	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	4.70 b	0.60 a	0.60 a
(C) FLOUNDERFLESH														
110180	A	1	910923	09:10	T2	78	0.72 b	0.74 b	0.68 a	0.68 a	0.12 f	0.45 f	0.24 f	0.68 a
110181	A	1	910925	13:50	T5	77	0.60 a	3.70	5.80	0.60 a	0.60 a	5.10 b	0.60 a	0.60 a
110182	A	1	910925	08:45	T7	75	2.40 a	2.40 a	4.30 b	2.40 a	2.40 a	9.60 a	2.40 a	2.40 a
110183	A	1	910925	08:00	T4	80	0.75 a	0.75 a	3.37	0.75 a	0.75 a	0.98 b	0.33 f	0.75 a
110184	A	1	910925	10:10	T9	79	0.71 a	0.71 a	3.06	0.53 f	0.22 f	0.94 f	0.71 a	0.71 a
110185	A	1	910926	10:32	T6	80	0.74 a	0.74 a	0.78 b	0.74 a	0.74 a	2.96 a	0.74 a	0.63 f
110186	A	1	910926	08:50	T3	78	2.64	0.68 a	1.43 b	0.68 a	0.16 f	0.72 f	0.33 f	0.68 a
110187	A	1	910926	12:36	T8	80	0.70 a	0.70 a	2.20 b	0.70 a	0.70 a	4.20 b	0.70 a	0.70 a
110188	A	1	910927	09:00	T1	76	0.38 f	1.63 b	0.81 b	0.62 a	0.35 f	0.38 f	0.62 a	0.62 a
(D) FLOUNDERLIVER														
110180	B	1	910923	09:10	T2	71	3.17 b	2.03 a	9.62	2.03 a	2.90 b	6.76 f	0.99 f	0.63 f
110181	B	1	910925	13:50	T5	80	50.00 a	50.00 a	50.00 a	50.00 a	50.00 a	200.00 a	50.00 a	50.00 a
110183	B	1	910925	08:00	T4	72	4.29 a	4.29 a	8.36 b	4.53 b	4.29 a	2.99 f	1.46 f	4.29 a
110184	B	1	910925	10:10	T9	71	2.07 a	2.07 a	179.43	2.75 b	8.43	37.47	4.85 b	2.07 a
110185	B	1	910926	10:32	T6	71	26.59	4.50 a	29.81	0.44 f	5.92 b	7.20 f	4.50 a	4.50 a
110186	B	1	910926	08:50	T3	64	7.64	1.60 a	76.51	1.60 a	4.41 b	23.98	3.22 b	2.23 b
110187	B	1	910926	12:36	T8	80	30.00 a	16.00 a	37.00 a	30.00 a	30.00 a	120.00 a	30.00 a	30.00 a
110188	B	1	910927	09:00	T1	71	8.07	35.38	21.27	2.03 a	5.77 b	6.45 b	2.03 a	2.03 a
(E) FUCOID														
110141	A	1	911007	18:00	22	16	0.22 f	1.33 b	0.19 f	0.60 a	0.23 f	0.37 f	0.60 a	0.60 a
110142	A	1	910916	13:15	3	12	0.44 f	2.39	1.07 b	0.60 a	0.60 a	0.37 f	1.38 b	0.60 a

(Contd)

PESTICIDE CONCENTRATIONS (ug/Kg) and DATA FLAGS

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP		DDDPP		DDEOP		DDEPP		DDTOP		DDTPP		SUMPEST
(A) EELGRASS LEAVES																			
110042	A	1	910916	13:30	3	15	0.60	a	0.80	b	0.60	a	2.00	a	0.60	a	0.60	a	11.80
110042	A	2	910916	13:30	3	15	0.60	a	0.70	b	0.60	a	2.00	a	0.60	a	0.60	a	11.70
110044	A	1	910917	14:30	19	10	0.60	a	0.80	b	0.60	a	2.00	a	0.60	a	0.60	a	11.80
110053	A	1	911022	16:30	12A	10	0.70	a	0.70	a	0.70	a	2.20	a	0.70	a	1.40	b	14.40
110053	A	2	911022	16:30	12A	10	0.70	a	0.70	a	0.70	a	2.20	a	0.70	a	4.30		17.20
(B) EELGRASSROOTS																			
110042	C	1	910916	13:30	3	12	0.60	a	1.00	b	0.60	a	2.00	a	0.60	a	0.60	a	12.80
110044	C	1	910917	14:30	19	10	2.00		2.30		0.60	a	2.00	a	0.60	a	0.60	a	17.00
(C) FLOUNDERFLESH																			
110180	A	1	910923	09:10	T2	78	0.68	a	0.24	f	0.68	a	2.39	b	0.68	a	1.06	b	9.99
110181	A	1	910925	13:50	T5	77	0.60	a	12.00		0.60	a	41.00		0.60	a	1.40	b	73.80
110182	A	1	910925	08:45	T7	75	2.40	a	2.40	a	2.40	a	21.00		2.40	a	2.40	a	61.30
110183	A	1	910925	08:00	T4	80	2.28	b	6.42		1.54	b	14.43		0.75	a	4.02		37.86
110184	A	1	910925	10:10	T9	79	0.71	a	3.82		0.77	b	5.46	b	0.71	a	4.70		23.79
110185	A	1	910926	10:32	T6	80	0.74	a	0.74	a	0.18	f	2.46	a	4.14		0.74	a	17.06
110186	A	1	910926	08:50	T3	78	0.68	a	0.68	a	0.60	f	3.68	b	4.04		24.13		41.11
110187	A	1	910926	12:36	T8	80	0.70	a	0.70	a	0.70	a	8.90		0.70	a	1.20	b	23.50
110188	A	1	910927	09:00	T1	76	0.62	a	1.46	b	0.62	a	3.30	b	0.62	a	0.62	a	12.63
(D) FLOUNDERLIVER																			
110180	B	1	910923	09:10	T2	71	13.49		12.94		1.79	f	37.36		2.03	a	2.03	a	97.77
110181	B	1	910925	13:50	T5	80	50.00	a	50.00	a	50.00	a	170.00	a	50.00	a	50.00	a	970.00
110183	B	1	910925	08:00	T4	72	3.09	f	4.29	a	1.98	f	30.02	b	4.29	a	65.84		144.00
110184	B	1	910925	10:10	T9	71	2.07	a	2.07	a	40.66		445.30		2.07	a	2.07	a	733.38
110185	B	1	910926	10:32	T6	71	4.50	a	47.58		6.19	b	105.54		4.50	a	4.50	a	256.26
110186	B	1	910926	08:50	T3	64	674.69		1.60	a	17.80		151.40		1.60	a	1.60	a	969.89
110187	B	1	910926	12:36	T8	80	30.00	a	30.00	a	30.00	a	100.00	a	30.00	a	30.00	a	573.00
110188	B	1	910927	09:00	T1	71	2.03	a	30.57		2.03	a	121.85		2.23	b	22.58		264.31
(E) FUCOID																			
110141	A	1	911007	18:00	22	16	0.60	a	0.29	f	0.20	f	0.19	f	0.13	f	0.60	a	6.15
110142	A	1	910916	13:15	3	12	0.12	f	0.71	b	0.60	a	0.30	f	0.52	f	0.60	a	10.30

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
110143	A	1	910916	14:30	19	11	0.60 a	3.00	0.60 a	0.80 b	0.60 a	2.40 a	0.60 a	0.60 a
110144	A	1	910918	12:50	9	15	0.47 f	4.75	0.54 f	0.60 a	0.19 f	0.86 f	1.22 b	0.60 a
110145	A	1	910918	13:00	8	15	0.60 a	3.10	0.60 a	2.00	0.60 a	2.40 a	0.60 a	0.60 a
110145	A	2	910918	13:00	8	15	0.60 a	3.40	0.70 b	2.70	0.60 a	2.40 a	0.60 a	0.60 a
110146	A	1	910918	13:30	10	14	0.60 a	1.40 b	1.30 b	2.00	0.60 a	2.40 a	0.60 a	0.60 a
110147	A	1	910918	14:00	17	15	0.53 f	2.62	0.60 f	0.70 b	0.17 f	1.46 f	0.60 a	0.60 a
110147	A	2	910918	14:00	17	15	0.51 f	2.69	0.57 b	0.94 b	0.17 f	1.22 f	0.60 a	0.60 a
110148	A	1	910927	08:30	10A	14	0.82 b	2.28	0.82 b	0.42 f	0.12 f	0.18 f	2.46	0.60 a
110149	A	1	910927	09:30	10A	16	0.90 b	1.80 b	0.60 a	0.60 a	0.60 a	2.40 a	0.60 a	0.60 a
(F) LOBSTER HEPATOPANCREAS														
110150	B	1	910923	09:10	T2	53	1.18 a	1.18 a	88.82	2.18 b	4.90	90.73	42.48	1.18 a
110151	B	1	910925	13:50	T5	51	1.20 a	24.00	46.00	1.20 a	1.20 a	24.00	1.30 b	1.70 b
110152	B	1	910925	08:45	T7	54	1.20 a	25.00	60.00	1.20 a	1.20 a	42.00	2.70 b	2.60 b
110153	B	1	910925	08:00	T4	66	1.67 a	1.67 a	66.32	1.61 f	1.67 a	55.18	1.67 a	2.90 b
110154	B	1	910925	10:10	T9	73	2.06 a	2.06 a	27.07	2.47 b	2.06	25.45 b	1.92 f	2.06 a
110155	B	1	910926	10:32	T6	58	3.91 b	1.32 a	1.32 a	1.32 a	1.32 a	5.29 a	0.92 f	1.32 a
110156	B	1	910926	08:50	T3	47	6.53	1.13 a	49.33	2.14 b	1.13 a	4.53 a	1.13 a	1.68 b
110157	B	1	910926	12:36	T8	60	1.50 a	18.00	46.00	1.50 a	1.50 a	24.00	3.90 b	1.50 a
110158	B	1	910927	09:00	T1	61	1.45 a	1.45 a	61.23	1.43 f	1.45 a	46.42	1.86 b	1.45 a
(G) LOBSTER TAIL FLESH														
110150	A	1	910923	09:10	T2	79	0.51 f	0.41 f	0.42 f	0.04 f	0.53 f	0.61 f	0.36 f	0.71 a
110150	A	2	910923	09:10	T2	79	0.76 f	0.97 b	0.88 b	0.00 f	1.40 b	1.04 f	0.66 f	0.43 f
110151	A	1	910925	13:50	T5	78	0.70 a	0.70 a	0.70 b	0.70 a	0.70 a	2.70 a	0.70 a	0.70 a
110152	A	1	910925	08:45	T7	79	0.70 a	0.70 a	0.70 b	0.70 a	2.30	2.80 a	0.70 a	0.70 a
110153	A	1	910925	08:00	T4	81	0.79 a	0.92 b	1.80 b	0.79 a	0.79 a	4.75 b	2.03 b	0.79 a
110153	A	2	910925	08:00	T4	81	0.79 a	0.34 f	0.89 b	0.79 a	0.26 f	1.19 b	2.74	0.79 a
110154	A	1	910925	10:10	T9	81	2.07 a	0.42 f	0.87 f	2.07 a	0.18 f	0.78 f	0.61 f	2.07 a
110155	A	1	910926	10:32	T6	79	0.55 f	1.09 b	0.56 f	0.71 a	0.78 b	1.32 f	0.32 f	0.71 a
110156	A	1	910926	08:50	T3	77	2.05	0.21 f	0.78 f	0.64 a	0.08 f	0.84 f	0.41 f	0.64 a
110157	A	1	910926	12:36	T8	79	0.70 a	0.70 a	0.70 b	0.70 a	0.70 a	2.80 a	0.70 a	0.70 a
110157	A	2	910926	12:36	T8	79	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a	2.80 a	0.70 a	0.70 a
110158	A	1	910927	09:00	T1	81	0.44 f	1.34 b	0.69 f	0.77 a	1.26 b	0.75 f	0.40 f	0.77 a
(H) MUSSEL														
110060	C	1	911010	08:50	26	90	1.86 b	5.17	8.68	0.17 f	0.83 f	1.59 f	1.16 f	1.49 a
110061	A	1	910910	08:00	28	87	1.95 b	7.45	4.87	1.15 a	1.15 a	0.74 f	0.41 f	0.43 f

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP	DDDPP	DDEOP	DDEPP	DDTOP	DDTPP	SUMPEST
110143	A	1	910916	14:30	19	11	0.60 a	0.60 a	0.60 b	2.00 a	0.60 a	0.60 a	14.20
110144	A	1	910918	12:50	9	15	0.60 a	0.73 b	1.52 b	1.83 f	1.28 b	0.60 a	15.79
110145	A	1	910918	13:00	8	15	0.60 a	0.60 a	1.10 b	2.00 a	0.60 a	0.60 a	16.00
110145	A	2	910918	13:00	8	15	0.60 a	0.60 a	1.70 b	2.00 a	0.60 a	0.60 a	17.70
110146	A	1	910918	13:30	10	14	0.60 a	0.60 a	0.60 a	2.00 a	0.60 a	0.60 a	14.50
110147	A	1	910918	14:00	17	15	0.60 a	0.81 b	0.43 f	0.61 f	0.32 f	0.60 a	10.64
110147	A	2	910918	14:00	17	15	0.60 a	0.68 b	0.39 f	0.49 f	0.79 b	0.60 a	10.85
110148	A	1	910927	08:30	10A	14	0.60 a	0.60 a	1.00 b	0.85 b	0.92 b	0.54 f	12.19
110149	A	1	910927	09:30	10A	16	0.60 a	0.60 a	0.60 a	2.00 a	0.60 a	0.60 a	13.10
(F) LOBSTER HEPATOPANCREAS													
110150	B	1	910923	09:10	T2	53	1.18 a	1.18 a	16.21	911.89	1.18 a	1.18 a	1165.48
110151	B	1	910925	13:50	T5	51	1.20 a	45.00	8.80	380.00	14.00	15.00	564.60
110152	B	1	910925	08:45	T7	54	1.20 a	65.00	7.20	530.00	1.20 a	17.00	757.50
110153	B	1	910925	08:00	T4	66	1.67 a	115.82	8.37	732.86	1.67 a	23.33	1016.37
110154	B	1	910925	10:10	T9	73	2.06 a	27.86	2.06 a	566.80	30.37	77.58	771.86
110155	B	1	910926	10:32	T6	58	1.32 a	48.72	5.61	4.41 a	1.32 a	1.32 a	79.44
110156	B	1	910926	08:50	T3	47	1.13 a	49.51	3.64 b	517.06	7.55	12.46	658.96
110157	B	1	910926	12:36	T8	60	1.50 a	57.00	1.50 a	640.00	1.50 a	1.50 a	800.90
110158	B	1	910927	09:00	T1	61	1.45 a	90.54	12.47	698.71	1.45 a	1.45 a	922.81
(G) LOBSTER TAIL FLESH													
110150	A	1	910923	09:10	T2	79	0.71 a	0.45 f	0.71 a	1.64 b	0.71 a	1.03 b	8.87
110150	A	2	910923	09:10	T2	79	0.70 a	1.25 b	0.70 a	2.05 f	0.70 a	1.23 b	12.77
110151	A	1	910925	13:50	T5	78	0.70 a	0.70 a	0.70 a	3.40 b	0.70 a	0.70 a	14.50
110152	A	1	910925	08:45	T7	79	0.70 a	0.70 a	0.70 a	4.80 b	0.70 a	0.70 a	17.60
110153	A	1	910925	08:00	T4	81	1.08 b	0.79 a	0.79 a	4.34 b	0.79 a	19.02	39.45
110153	A	2	910925	08:00	T4	81	0.79 a	1.71 b	0.33 f	4.53 b	0.34 f	3.79	19.28
110154	A	1	910925	10:10	T9	81	2.07 a	1.38 f	2.07 a	6.84 b	2.07 a	2.62 b	26.12
110155	A	1	910926	10:32	T6	79	0.71 a	1.61 b	0.71 a	1.85 f	0.71 a	2.38	14.02
110156	A	1	910926	08:50	T3	77	0.64 a	0.64 a	0.64 a	2.42 b	0.64 a	0.64 a	11.24
110157	A	1	910926	12:36	T8	79	0.70 a	0.70 a	0.70 a	6.60 b	0.70 a	0.70 a	17.80
110157	A	2	910926	12:36	T8	79	2.60 b	0.70 a	0.70 a	6.20 b	0.70 a	0.70 a	19.30
110158	A	1	910927	09:00	T1	81	0.77 a	2.08 b	0.77 a	4.26 b	0.77 a	1.00 b	16.06
(H) MUSSEL													
110060	C	1	911010	08:50	26	90	4.96	24.93	1.49 a	44.91	2.44 b	6.45	106.13
110061	A	1	910910	08:00	28	87	3.22 b	15.20	1.15 a	27.60	0.23 f	1.15 a	66.69

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
110062	A	1	910920	17:20	27	89	2.68 b	7.76	3.64 b	1.34 a	0.93 f	2.61 f	4.64	0.67 f
110063	A	1	910930	13:00	25	89	2.64 b	5.77	4.85	1.32 a	1.32 a	0.94 f	0.28 f	0.04 f
110064	A	1	911001	12:45	24	89	2.66 b	5.69	4.67	1.35 a	0.50 f	1.14 f	0.90 f	1.35 a
110070	A	1	910912	07:30	17	88	2.42 b	3.30 b	3.15 b	1.24 a	2.31 b	1.84 f	0.96 f	1.24 a
110070	A	2	910912	07:30	17	88	2.19 b	2.82 b	2.61 b	1.22 a	1.90 b	1.38 f	0.73 f	1.22 a
110071	A	1	910912	08:00	20	88	3.06 b	7.60	4.10 b	0.26 f	1.25 a	1.76 f	0.83 f	1.25 a
110072	A	1	910912	08:25	21	86	0.67 f	2.90 b	2.44 b	0.12 f	1.07 a	1.39 f	1.08 b	1.07 a
110073	A	1	910916	12:00	1	88	1.55 b	6.79	3.90 b	1.23 a	0.40 f	0.77 f	0.46 f	1.23 a
110074	A	1	910916	12:45	14	88	1.20 f	1.82 b	1.70 b	1.24 a	0.08 f	0.50 f	0.45 f	1.24 a
110075	B	1	911001	11:45	2	87	3.77	2.62 b	2.65 b	1.12 a	0.46 f	5.48 b	1.04 f	1.12 a
110076	A	1	910923	07:15	11	87	1.93 b	1.08 a	3.92	1.08 a	0.19 f	1.54 f	1.19 b	1.08 a
110077	A	1	910923	08:00	16	86	1.68 b	2.55 b	2.68 b	1.06 a	0.21 f	0.89 f	0.65 f	1.06 a
110078	A	1	910927	07:45	19	94.5	2.70 b	2.10 a	2.40 b	2.10 a	2.10 a	8.60 a	2.10 a	2.10 a
110078	A	2	910927	07:45	19	94.5	2.20 a	3.40 b	3.30 b	2.20 a	2.20 a	8.70 a	2.20 a	2.20 a
110079	A	1	910927	08:15	10A	88	2.65 b	5.38	3.49 b	1.19 a	0.15 f	0.67 f	0.14 f	1.19 a
110080	A	1	910930	09:40	3	92.1	1.50 a	4.10 b	2.60 b	1.50 a	1.50 a	6.00 a	1.50 a	1.50 a
110081	A	1	910930	10:20	5	87	2.68 b	2.47 b	2.90 b	1.15 a	0.65 f	1.07 f	1.19 b	1.15 a
110082	A	1	910930	10:55	7	85	2.41 b	3.00 b	3.73	1.00 a	0.14 f	0.72 f	0.61 f	0.38 f
110083	A	1	910930	11:30	8	85	0.90 f	7.59	8.40	0.10 f	0.62 f	2.97 f	0.24 f	0.96 a
110083	A	2	910930	11:30	8	85	0.83 f	7.39	7.67	0.15 f	0.59 f	1.41 f	0.21 f	0.97 a
110084	A	1	910930	11:55	9	87	1.18 b	2.98 b	4.23	0.07 f	0.31 f	0.70 f	31.85	1.14 a
110085	A	1	911003	12:05	6	86	1.59 b	8.24	4.48	1.05 a	0.49 f	1.14 f	0.62 f	1.05 a
110086	A	1	911003	13:00	4	87	1.09 f	4.50	2.33 b	1.14 a	0.33 f	0.77 f	0.45 f	1.14 a
110087	A	1	911003	13:30	18	85	0.85 f	5.43	2.94 b	0.97 a	0.20 f	0.58 f	0.35 f	0.97 a
110088	A	1	911004	07:58	22	85	1.32 b	0.97 a	7.77	5.10	0.42 f	0.29 f	0.35 f	0.97 a
110089	A	1	911004	09:24	23	85	0.63 f	6.74	3.47	0.94 a	0.47 f	0.76 f	0.50 f	0.94 a
110090	A	1	911022	15:00	10	89	2.20 b	1.80 b	2.40 b	0.60 a	0.60 a	2.40 a	0.60 a	0.60 a
110090	A	2	911022	15:00	10	89	2.80 b	2.20 b	1.90 b	0.60 a	0.60 a	2.40 a	0.60 a	0.60 a
110091	A	1	911022	16:00	12	90	3.15 b	1.30 b	2.07 a	0.36 f	0.33 f	0.63 f	0.76 f	1.20 a
110091	A	2	911022	16:00	12	90	1.20 a	1.20 a	1.20 a	1.20 a	0.73 f	0.70 f	1.20 a	1.20 a
110092	A	1	911022	15:30	12A	90	2.31 b	1.72 b	2.37 b	1.18 a	1.18 a	0.45 f	0.87 f	1.18 a
110390	A	1	911217	07:30	1	91	1.41 f	1.52 f	1.57 f	0.06 f	0.30 f	0.60 f	0.23 f	1.64 a
110391	A	1	911217	09:30	12A	92	1.33 f	1.03 f	1.18 f	0.12 f	0.10 f	0.47 f	0.39 f	1.88 a
110392	A	1	911217	15:00	17	88	1.38 b	1.91 b	2.49 b	0.10 f	0.21 f	0.43 f	0.12 f	1.24 a
110393	A	1	911218	13:30	23	89	0.50 f	2.21 b	2.22 b	0.16 f	0.11 f	0.60 f	0.36 f	1.36 a
110394	A	1	911219	14:15	9	90	1.58 f	2.55 b	2.81 b	0.22 f	0.20 f	0.53 f	0.29 f	1.49 a
110395	A	1	911219	14:30	3	91	1.24 f	1.80 b	2.48 b	0.23 f	0.07 f	0.37 f	0.49 f	1.64 a
110396	A	1	911219	14:45	19	92	1.22 f	3.94 b	2.58 b	0.27 f	0.37 f	0.60 f	0.47 f	1.83 a

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EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP	DDDPP	DDEOP	DDEPP	DDTOP	DDTPP	SUMPEST
110062	A	1	910920	17:20	27	89	1.11 f	11.57	1.34 a	14.41	1.34 a	14.63	68.66
110063	A	1	910930	13:00	25	89	1.32 a	9.94	1.32 a	10.43 b	1.32 a	2.07 b	43.54
110064	A	1	911001	12:45	24	89	2.74 b	12.64	1.35 a	11.07 b	0.79 f	5.50	52.34
110070	A	1	910912	07:30	17	88	2.34 b	10.96	1.24 a	13.48	1.24 a	2.52 b	48.25
110070	A	2	910912	07:30	17	88	1.48 b	9.65	1.22 a	11.65	1.22 a	2.29 b	41.58
110071	A	1	910912	08:00	20	88	2.76 b	12.52	1.25 a	18.17	1.25 a	11.38	67.44
110072	A	1	910912	08:25	21	86	1.11 b	9.75	1.07 a	13.14	1.07 a	4.16	41.01
110073	A	1	910916	12:00	1	88	1.41 b	10.14	0.90 f	13.01 b	1.23 a	7.12	50.13
110074	A	1	910916	12:45	14	88	0.16 f	5.08	1.24 a	5.83 b	1.24 a	1.67 b	23.44
110075	B	1	911001	11:45	2	87	1.96 b	9.54	1.12 a	10.38 b	1.12 a	9.63	52.02
110076	A	1	910923	07:15	11	87	2.52 b	10.15	1.08 a	15.00	1.08 a	2.70 b	44.54
110077	A	1	910923	08:00	16	86	1.06 a	7.53	1.06 a	9.51 b	1.06 a	9.91	40.91
110078	A	1	910927	07:45	19	94.5	2.10 a	10.00	2.70 b	11.00 b	2.10 a	7.50	59.60
110078	A	2	910927	07:45	19	94.5	2.20 a	7.80	2.20 a	7.40 b	2.20 a	5.40 b	53.60
110079	A	1	910927	08:15	10A	88	1.19 a	6.96	1.19 a	12.98 b	1.19 a	4.05	42.41
110080	A	1	910930	09:40	3	92.1	1.50 a	11.00	1.50 a	10.00 b	1.80 b	6.30	52.30
110081	A	1	910930	10:20	5	87	3.01 b	15.34	1.15 a	9.81 b	2.19 b	5.33	50.09
110082	A	1	910930	10:55	7	85	9.10	46.97	1.00 a	19.33	1.00 a	11.62	101.01
110083	A	1	910930	11:30	8	85	7.61	37.37	0.96 a	30.48	4.46	16.89	119.56
110083	A	2	910930	11:30	8	85	7.32	37.76	0.97 a	30.50	3.71	13.67	113.15
110084	A	1	910930	11:55	9	87	6.27	17.50	1.14 a	15.64	26.71	54.56	164.26
110085	A	1	911003	12:05	6	86	1.05 a	14.60	1.05 a	12.89	1.74 b	5.90	55.88
110086	A	1	911003	13:00	4	87	1.14 a	7.13	1.14 a	7.68 b	0.08 f	3.05 b	31.95
110087	A	1	911003	13:30	18	85	0.97 a	8.81	0.97 a	10.55 b	1.38 b	7.93	42.90
110088	A	1	911004	07:58	22	85	2.64 b	6.22	0.97 a	5.31 b	0.97 a	6.83	40.11
110089	A	1	911004	09:24	23	85	1.53 b	5.58	0.60 f	4.12 b	0.37 f	0.94 a	27.60
110090	A	1	911022	15:00	10	89	3.70	2.00 b	1.30 b	7.50 b	0.60 a	0.60 a	26.90
110090	A	2	911022	15:00	10	89	2.20 b	6.80	1.40 b	8.70 b	0.60 a	0.60 a	32.00
110091	A	1	911022	16:00	12	90	1.20 a	5.18	1.20 a	7.76	1.20 a	1.20 a	27.50
110091	A	2	911022	16:00	12	90	1.20 a	3.52 b	1.20 a	9.82	1.20 a	1.20 a	26.72
110092	A	1	911022	15:30	12A	90	1.18 a	3.99	1.18 a	10.09 b	1.54 b	3.81 b	33.05
110390	A	1	911217	07:30	1	91	1.18 f	4.43 b	0.17 f	5.87 b	0.64 f	2.19 b	21.81
110391	A	1	911217	09:30	12A	92	1.88 a	3.53 b	0.79 f	4.87 f	0.88 f	2.21 b	20.65
110392	A	1	911217	15:00	17	88	1.24 a	5.87	1.07 f	9.33 b	0.12 f	4.96	30.46
110393	A	1	911218	13:30	23	89	1.26 f	3.31 b	0.52 f	5.51 b	1.36 a	3.35 b	22.81
110394	A	1	911219	14:15	9	90	1.85 b	7.89	1.56 b	11.65 b	4.56 b	19.95	57.12
110395	A	1	911219	14:30	3	91	0.96 f	7.76	0.94 f	7.52 b	1.64 a	7.60	34.72
110396	A	1	911219	14:45	19	92	1.83 a	5.46 b	1.83 a	8.93 b	0.40 f	3.52 b	33.25

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EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
110396	A	2	911219	14:45	19	92	1.02 f	4.30 b	2.79 b	0.24 f	0.08 f	0.77 f	0.51 f	1.87 a
110397	A	1	911219	15:15	18	90	4.50 b	1.28 f	2.41 b	0.25 f	0.23 f	0.40 f	0.33 f	1.49 a
110398	A	1	920310	7:40	16	86	1.12 b	1.67 b	1.98 b	0.37 f	0.36 f	0.98 f	0.53 f	0.30 f
110399	A	1	920310	8:40	17	89	1.28 f	1.18 f	1.93 b	1.35 a	0.19 f	1.07 f	0.50 f	0.27 f
110400	A	1	920310	10:40	12A	88	0.99 f	2.54 b	2.21 b	1.23 a	0.22 f	1.01 f	0.43 f	0.32 f
110401	A	1	920317	12:40	1	88	1.37 b	1.42 b	4.38	1.25 a	0.17 f	1.14 f	0.61 f	1.25 a
110402	A	1	920318	14:40	9	87	0.97 f	1.21 b	1.55 b	1.15 a	0.14 f	0.64 f	0.40 f	1.15 a
110403	A	1	920318	15:08	3	88	1.52 b	1.46 b	2.90 b	1.23 a	0.46 f	1.30 f	0.95 f	0.41 f
110404	A	1	920318	15:35	19	88	1.59 b	2.23 b	1.24 a	1.24 a	0.24 f	0.99 f	0.69 f	1.24 a
110405	A	1	920318	16:19	18	88	1.43 b	1.67 b	2.30 b	1.23 a	0.24 f	0.98 f	0.66 f	1.23 a
110405	A	2	920318	16:19	18	88	1.78 b	2.23 b	2.81 b	1.25 a	0.70 f	0.69 f	0.87 f	1.25 a
110406	A	1	920318	16:19	23	87	1.15 f	1.65 b	2.80 b	1.15 a	0.28 f	1.69 f	1.03 f	1.15 a
(I) OYSTER														
110060	A	1	910910	07:30	26	88	1.37 b	18.68	8.99	1.25 a	0.58 f	1.04 f	1.21 f	1.25 a
110061	B	1	911010	09:45	28	89	6.53	28.06	17.74	1.36 a	2.81 b	1.81 f	7.40	1.36 a
110065	A	1	911004	15:10	31	92	4.32 b	18.98	10.83	0.64 f	1.26 f	1.03 f	1.27 f	0.54 f
110066	A	1	911004	15:25	29	90	2.11 b	8.14	8.56	0.30 f	0.99 f	1.08 f	1.31 f	1.49 a
(J) POST DEPLOYMENT MUSSEL														
798951	A	1	911023		2	84	0.92 a	4.88	3.97	0.97 b	1.55 b	1.23 f	0.92 a	0.92 a
798952	A	1	911023		2	83	0.87 a	4.83	4.80	0.87 a	2.00 b	1.46 f	0.83 f	0.87 a
798953	A	1	911023		2	85	0.99 a	5.66	4.62	0.99 a	1.22 b	2.71 f	0.11 f	1.28 b
798955	A	1	911023		8	84	0.32 f	4.00	3.47	0.93 a	0.53 f	3.05 f	1.21 b	1.49 b
798956	A	1	911023		8	82	0.75 f	7.23	5.45	2.28 b	1.65 a	4.38 b	1.31 f	3.49 b
798956	A	2	911023		8	82	1.01 f	5.37	5.09 b	1.84 b	1.62 a	3.43 f	1.02 f	1.59 f
798957	A	1	911023		8	84	0.94 a	5.09	5.34	0.70 f	2.32 b	5.06 b	0.94 a	0.94 a
798963	A	1	911023		15	85	4.27	9.62	6.52	4.86	3.06 b	3.84 f	10.37	2.05 b
798964	A	1	911023		15	81	0.33 f	7.40	7.57	0.79 a	0.79 a	1.53 f	0.79 a	0.46 f
798965	A	1	911023		15	84	6.67	7.46	4.57	2.88 b	0.92 a	3.04 f	2.62 b	0.66 f
798967	A	1	911023		19	82	0.82 a	7.71	6.76	0.82 a	0.82 a	1.60 f	0.73 f	1.13 b
798968	A	1	911023		19	83	0.87 a	7.34	9.34	2.06 b	1.54 b	1.52 f	0.27 f	0.78 f
798969	A	1	911023		19	82	0.36 f	5.37	4.54	0.83 a	0.83 a	3.35 b	0.83 a	0.76 b
798971	A	1	911023		22	85	0.56 f	6.98	5.22	0.25 f	3.58	2.01 f	0.98 a	2.75 b
798972	A	1	911023		22	83	0.75 f	6.75 b	3.57 b	2.13 a	1.82 f	8.96 b	2.13 a	2.13 a
798972	A	2	911023		22	83	1.08 f	5.07 b	2.70 b	2.03 a	2.06 b	6.83 f	2.03 a	2.03 a
798973	A	1	911023		22	85	1.85 f	6.01 b	3.41 b	2.41 a	3.23 b	10.96 b	3.94 b	1.36 f

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EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP	DDDPP	DDEOP	DDEPP	DDTOP	DDTPP	SUMPEST
110396	A	2	911219	14:45	19	92	1.87 a	5.66 b	1.87 a	9.34 b	1.87 a	3.88 b	36.04
110397	A	1	911219	15:15	18	90	0.97 f	6.25	1.12 f	9.17 b	1.10 f	9.11	38.58
110398	A	1	920310	7:40	16	86	1.70 b	10.30	2.24 b	9.35	5.91	6.42 a	43.21
110399	A	1	920310	8:40	17	89	1.35 a	7.79	1.14 f	6.91 b	3.01 b	3.23 a	31.20
110400	A	1	920310	10:40	12A	88	1.23 a	7.70	1.15 f	8.23 b	3.49 b	26.53	57.27
110401	A	1	920317	12:40	1	88	0.95 f	7.54	1.25 a	5.39	0.53 f	4.51 a	31.75
110402	A	1	920318	14:40	9	87	1.15 a	8.55	1.33 b	9.57	7.51	35.08	70.40
110403	A	1	920318	15:08	3	88	1.23 a	10.66	1.23 a	6.85 b	3.04 b	8.25 a	41.49
110404	A	1	920318	15:35	19	88	1.24 a	8.50	1.09 b	8.28 b	3.23 b	25.44	57.25
110405	A	1	920318	16:19	18	88	1.23 a	9.55	1.23 a	9.96 b	4.41	9.54	45.63
110405	A	2	920318	16:19	18	88	1.25 a	11.31	1.25 a	9.45 b	3.27 b	7.16 a	45.26
110406	A	1	920318	16:19	23	87	4.07	7.68	0.82 f	6.88 b	1.81 b	22.74	54.89
(I) OYSTER													
110060	A	1	910910	07:30	26	88	7.05	30.09	1.25 a	48.55	0.24 f	1.25 a	122.81
110061	B	1	911010	09:45	28	89	1.36 a	42.13	1.36 a	109.13	1.36 a	3.56 b	225.96
110065	A	1	911004	15:10	31	92	1.15 f	32.52	1.86 a	71.98	1.86 a	17.12	165.36
110066	A	1	911004	15:25	29	90	6.10	26.57	1.49 a	64.51	1.49 a	8.50	132.62
(J) POST DEPLOYMENT MUSSEL													
798951	A	1	911023		2	84	0.92 a	9.21	6.70	9.21 b	4.40	27.88	73.70
798952	A	1	911023		2	83	4.23	9.66	0.87 a	22.82	3.46	21.42	78.99
798953	A	1	911023		2	85	0.74 f	9.15	0.99 a	14.08	3.89	21.04	67.47
798955	A	1	911023		8	84	4.22	8.78	0.93 a	12.68	2.31 b	8.85	52.78
798956	A	1	911023		8	82	3.32 b	8.75	6.20	19.07	4.82 b	30.18	98.88
798956	A	2	911023		8	82	4.51 b	10.76	39.79	18.61	5.49	20.92	121.04
798957	A	1	911023		8	84	3.99	14.22	0.94 a	25.71	2.71 b	10.83	79.70
798963	A	1	911023		15	85	7.37	22.79	0.99 a	31.08	3.98	48.73	159.55
798964	A	1	911023		15	81	6.74	24.30	0.79 a	29.03	0.16 f	0.79 a	81.46
798965	A	1	911023		15	84	4.24	27.62	0.92 a	29.42	0.92 a	6.92	98.85
798967	A	1	911023		19	82	0.82 a	8.09	0.82 a	27.49	3.60	29.93	91.13
798968	A	1	911023		19	83	3.83	9.75	0.87 a	29.29	2.97	16.19	86.63
798969	A	1	911023		19	82	3.50	11.66	0.83 a	19.01	3.53	27.40	82.81
798971	A	1	911023		22	85	6.64	0.98 a	0.98 a	15.89	4.74	0.98 a	52.55
798972	A	1	911023		22	83	3.06 b	2.13 a	2.13 a	12.18 b	8.47	2.13 a	58.31
798972	A	2	911023		22	83	2.15 b	2.03 a	2.03 a	10.84 b	4.14 b	2.03 a	47.04
798973	A	1	911023		22	85	4.43 b	7.91 b	2.41 a	16.10 b	7.91 b	11.25 b	83.18

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
(K) PRE DEPLOYMENT MUSSEL														
798975	A	1	910918			85	1.00 a	3.20 b	3.16 b	1.00 a	0.86 f	0.84 f	1.00 f	0.26 f
798976	A	1	910918			86	2.60 b	3.26 b	3.38 b	1.41 a	0.82 f	1.38 f	0.15 f	81.34
798976	A	2	910918			86	2.54 b	3.99 b	4.30 b	1.37 a	0.81 f	1.90 f	0.58 f	93.32
798977	A	1	910918			84	1.23 a	4.97	5.69	1.23 a	3.08 b	1.18 f	1.23 a	1.23 a
(L) SEDIMENT CORE														
110001	A	1	910919	09:45	1	28	0.60 a	0.79 b	0.31 f	0.32 f	0.19 f	0.51 f	0.26 f	0.60 a
110001	B	1	910919	09:45	1	31	0.60 a	1.77 b	0.32 f	0.23 f	0.28 f	0.48 f	1.12 b	0.60 a
110003	A	1	910918	10:30	3	48	0.60 a	0.73 b	0.20 f	0.12 f	0.22 f	0.45 f	0.29 f	0.60 a
110003	B	1	910918	10:30	3	47	0.60 a	0.60 a	0.46 f	0.35 f	0.16 f	0.83 f	0.40 f	0.60 a
110004	A	1	910916	14:30	4	67	0.60 a	0.60 a	0.13 f	0.60 a	0.60 a	0.27 f	0.60 a	0.60 a
110004	B	1	910916	14:30	4	65	0.60 a	0.60 a	0.83 b	0.60 a	0.60 a	1.09 f	0.60 a	0.60 a
110005	A	1	910918	11:10	5	60	0.60 a	2.37	1.23 b	0.26 f	0.55 f	4.24 b	0.79 b	0.60 a
110005	B	1	910918	11:10	5	63	0.60 a	1.02 b	0.84 b	0.14 f	0.13 f	0.62 f	0.36 f	0.60 a
110005	C	1	910918	11:10	5	66	0.60 a	7.38	2.90	0.43 f	0.43 f	2.32 b	5.40	0.60 a
110006	A	1	910918	12:30	6	64	0.60 a	0.60 a	0.27 f	0.60 a	0.60 a	0.22 f	0.60 a	0.60 a
110006	B	1	910918	12:30	6	24	0.60 a	0.60 a	0.01 f	0.01 f	0.03 f	0.06 f	0.06 f	0.60 a
110006	B	2	910918	12:30	6	24	0.60 a	0.04 f	0.02 f	0.60 a	0.02 f	0.10 f	0.04 f	0.60 a
110007	A	1	910918	11:30	7	65	0.60 a	0.60 a	0.80 b	0.12 f	0.60 a	0.44 f	0.44 f	0.60 a
110007	B	1	910918	11:30	7	56	0.60 a	0.60 a	0.46 f	1.69 b	0.16 f	1.71 f	0.95 b	0.60 a
110007	C	1	910918	11:30	7	22	0.60 a	0.02 f	0.01 f	0.17 f	0.21 f	0.12 f	0.60 a	0.60 a
110008	A	1	910918	12:00	8	59	0.60 a	0.60 a	0.74 b	0.05 f	0.35 f	0.63 b	0.07 f	0.60 a
110008	B	1	910918	12:00	8	61	33.05	6.79	0.64 b	1.17 b	0.51 f	8.25	108.57	0.60 a
110010	A	1	910926	10:00	10	51	0.60 a	2.04	0.55 f	0.12 f	0.60 a	0.57 f	0.78 b	0.60 a
110010	B	1	910926	10:00	10	54	0.60 a	4.98	1.33 b	0.34 f	0.60 a	0.79 f	0.60 a	0.60 a
110010	C	1	910926	10:00	10	51	0.14 f	0.60 a	0.17 f	0.05 f	0.60 a	0.66 f	0.20 f	0.60 a
110010	D	1	910926	10:00	10	53	0.60 a	3.73	3.31	0.60 a	0.60 a	2.40 a	2.17	0.60 a
110010	E	1	910926	10:00	10	45	0.80 b	8.48	0.60 a	0.31 f	0.16 f	0.73 f	1.23 b	0.60 a
110012	A	1	910926	11:00	12	36	0.60 a	2.92	1.48 b	0.60 a	0.22 f	0.67 f	0.77 b	0.60 a
110012	B	1	910926	11:00	12	36	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.38 f	0.60 a	0.60 a
110012	C	1	910926	11:00	12	53	0.60 a	0.60 a	0.60 a	1.03 b	0.60 a	2.40 a	0.17 f	0.60 a
110012	C	2	910926	11:00	12	53	29.80	0.60 a	0.69 b	0.60 a	0.60 a	2.40 a	0.60 a	0.40 f
110014	A	1	910916	12:30	14	28	0.60 a	0.98 b	0.60 a	0.09 f	0.60 a	0.37 f	0.60 a	0.60 a
110014	B	1	910916	12:30	14	33	0.60 a	0.69 b	0.08 f	0.60 a	0.14 f	1.01 f	0.72 b	0.60 a
110014	C	1	910916	12:30	14	32	8.28	0.04 f	0.60 a	0.60 a	0.05 f	0.09 f	0.60 a	0.60 a
110015	A	1	910916	10:40	15	47	77.64	2.89	0.39 f	0.60 a	0.60 a	1.73 f	0.12 f	0.60 a
110015	B	1	910916	10:40	15	42	29.33	1.44 b	0.67 b	0.60 a	0.64 b	2.40 a	0.60 a	0.60 a

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP	DDDPP	DDEOP	DDEPP	DDTOP	DDTPP	SUMPEST
(K) PRE DEPLOYMENT MUSSEL													
798975	A	1	910918			85	4.91	24.24	5.37	8.72 b	1.00 a	1.00 a	56.56
798976	A	1	910918			86	3.86 b	13.79	2.75 b	9.20 b	2.07 b	1.41 a	127.42
798976	A	2	910918			86	4.92	17.51	3.36 b	9.11 b	2.34 b	1.37 a	147.44
798977	A	1	910918			84	7.81	25.04	4.21	12.88 b	3.82 b	7.25	80.83
(L) SEDIMENT CORE													
110001	A	1	910919	09:45	1	28	0.82 b	0.75 b	0.31 b	0.52 f	0.21 f	7.93	14.09
110001	B	1	910919	09:45	1	31	0.54 f	1.22 b	0.41 f	0.82 f	0.35 b	8.66	17.41
110003	A	1	910918	10:30	3	48	0.76 b	1.92 b	0.32 b	0.98 f	0.41 f	27.18	34.76
110003	B	1	910918	10:30	3	47	0.26 f	0.60 a	0.31 f	1.29 f	0.60 a	93.22	100.29
110004	A	1	910916	14:30	4	67	0.60 a	2.48	0.60 a	1.77 f	0.01 f	6.44	15.90
110004	B	1	910916	14:30	4	65	1.87 b	6.12	1.41 b	3.97	0.60 a	7.21	26.70
110005	A	1	910918	11:10	5	60	2.66	9.04	1.07 b	3.26 b	2.55	23.29	52.50
110005	B	1	910918	11:10	5	63	2.33	9.05	1.31 b	4.58 b	0.60 a	1.97 b	24.12
110005	C	1	910918	11:10	5	66	6.42	27.90	0.60 a	8.44	0.60 a	116.53	180.56
110006	A	1	910918	12:30	6	64	1.30 b	3.77	0.74 b	2.50 b	0.60 a	8.25	21.26
110006	B	1	910918	12:30	6	24	0.02 f	0.60 a	0.60 a	0.02 f	0.60 a	1.44 b	5.25
110006	B	2	910918	12:30	6	24	0.03 f	0.60 a	0.04 f	0.04 f	0.60 a	0.72 b	4.04
110007	A	1	910918	11:30	7	65	2.25	5.86	1.06 b	3.07 b	0.81 b	10.47	27.72
110007	B	1	910918	11:30	7	56	7.86	62.79	4.16	16.23	0.60 a	124.00	222.42
110007	C	1	910918	11:30	7	22	0.05 f	0.60 a	0.60 a	2.00 a	0.60 a	16.15	22.33
110008	A	1	910918	12:00	8	59	2.57	10.36	1.59 b	4.15 b	0.89 b	5.89	29.09
110008	B	1	910918	12:00	8	61	1.75 b	15.84	2.41	5.72 b	21.21	28.07	234.58
110010	A	1	910926	10:00	10	51	1.23 b	1.66 b	2.23	1.14 f	0.60 a	119.56	132.27
110010	B	1	910926	10:00	10	54	8.64	0.60 a	2.45	3.58 b	2.00	91.58	118.68
110010	C	1	910926	10:00	10	51	1.07 b	2.11	0.96 b	1.62 f	0.60 a	4.42	13.80
110010	D	1	910926	10:00	10	53	0.60 a	12.52	0.60 a	4.05 b	0.60 a	98.66	131.05
110010	E	1	910926	10:00	10	45	5.15	16.35	0.60 a	6.37 b	2.56	27.09	71.03
110012	A	1	910926	11:00	12	36	3.03	4.47	1.28 b	4.26 b	0.60 a	20.68	42.18
110012	B	1	910926	11:00	12	36	0.60 a	9.49	2.32	2.00 a	1.17 b	0.60 a	20.76
110012	C	1	910926	11:00	12	53	19.14	0.60 a	4.36	2.00 a	0.60 a	5.80	39.10
110012	C	2	910926	11:00	12	53	10.16	34.78	3.13	2.00 a	8.13	165.44	259.31
110014	A	1	910916	12:30	14	28	0.82 b	0.60 a	0.60 a	1.11 f	0.60 a	9.13	17.30
110014	B	1	910916	12:30	14	33	0.55 f	0.60 a	0.60 a	0.80 f	0.60 a	31.23	38.82
110014	C	1	910916	12:30	14	32	0.60 a	0.60 a	0.60 a	0.05 f	0.60 a	3.91	17.22
110015	A	1	910916	10:40	15	47	6.68	0.60 a	1.58 b	4.31 b	0.60 a	7.84	106.18
110015	B	1	910916	10:40	15	42	1.01 b	10.15	0.60 a	4.09 b	0.60 a	40.43	93.15

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EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
110015	C	1	910916	10:40	15	56	0.75 b	0.66 b	0.05 f	0.28 f	0.60 a	0.14 f	0.22 f	0.60 a
110015	D	1	910916	10:40	15	54	16.41	0.40 f	0.60 a	0.60 a	0.60 a	0.22 f	0.15 f	0.60 a
110017	A	1	910916	11:30	17	44	0.60 a	0.49 f	0.10 f	0.60 a	0.60 a	0.09 f	0.60 a	0.60 a
110017	B	1	910916	11:30	17	53	22.98	1.73	0.60 a	0.33 f	0.60 a	0.47 f	0.70 b	0.60 a
110017	C	1	910916	11:30	17	50	19.85	0.30 f	0.60 a	0.05 f	0.28 f	0.46 f	0.89 b	0.60 a
110019	A	1	910916	14:00	19	53	31.85	0.33 f	0.25 f	0.43 f	0.43 f	0.53 f	0.40 f	0.60 a
110019	A	2	910916	14:00	19	53	12.95	0.66 b	0.59 f	0.55 f	0.60 a	0.62 f	0.27 f	0.60 a
110019	B	1	910916	14:00	19	56	27.84	1.06 b	0.19 f	0.60 a	0.44 f	0.50 f	0.42 f	0.60 a
110019	C	1	910916	14:00	19	51	31.45	0.60 a	0.60 a	0.48 f	1.38 b	1.81 f	3.90	0.60 a
110021	A	1	911115	11:00	21	43	3.99	1.43 b	0.88 b	0.60 a	0.60 a	0.89 f	1.11 b	0.60 a
110021	B	1	911115	11:00	21	39	1.64 b	0.38 f	0.60 a	0.60 a	0.28 f	0.49 f	1.56 b	0.60 a
110021	B	2	911115	11:00	21	39	1.91 b	0.64 b	0.60 a	0.60 a	0.25 f	5.67 b	1.57 b	0.60 a
110021	C	1	911115	11:00	21	38	0.19 f	0.60 a	0.10 f	0.60 a	0.60 a	0.13 f	0.60 a	0.60 a
110021	D	1	911115	11:00	21	30	2.93	0.24 f	0.60 a	0.60 a	0.12 f	2.40 a	0.60 a	0.60 a
(M) SEDIMENT GRAB														
110210	B	1	910909	14:09	19	52	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110210	D	1	910909	14:45	19	51	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110210	E	1	910909	15:00	19	51	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110210	F	1	910909	15:08	19	48	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110211	C	1	910909	16:05	18	5	0.89 b	1.07 b	0.60 f	0.60 a	0.05 f	0.18 f	0.49 f	0.60 a
110211	C	2	910909	16:05	18	5	0.71 b	1.49 b	0.61 b	0.60 a	0.04 f	0.15 f	0.73 b	0.60 a
110212	C	1	910910	10:30	16	24	1.76 b	0.31 f	0.16 f	0.04 f	0.06 f	0.11 f	0.14 f	0.60 a
110213	C	1	910910	08:30	21	28	0.75 b	0.46 f	0.19 f	0.04 f	0.11 f	0.23 f	0.12 f	0.60 a
110214	C	1	910910	12:45	14	11	0.68 b	0.60 a	0.10 f	0.03 f	0.01 f	0.03 f	0.60 a	0.60 a
110215	C	1	910910	11:35	15	51	1.78 b	1.18 b	0.45 f	0.12 f	0.07 f	1.45 f	0.77 b	0.60 a
110216	C	1	910910	14:15	11	38	0.71 b	0.60 b	0.39 f	0.21 f	0.24 f	0.28 f	0.60 a	0.60 a
110217	B	1	910910	15:25	17	41	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110217	D	1	910910	15:40	17	39	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110217	E	1	910910	15:55	17	41	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110217	F	1	910910	16:10	17	47	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	1.00 b
110218	C	1	910911	10:55	12	35	19.75	1.52 b	0.28 f	0.60 a	0.60 a	0.26 f	1.06 b	0.60 a
110219	C	1	910911	12:30	13	45	2.20	0.60 a	0.51 f	0.09 f	0.04 f	1.62 f	0.27 f	0.60 a
110220	B	1	910911	13:45	10	55	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a
110220	D	1	910911	13:55	10	60	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a
110220	E	1	910911	14:07	10	52	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a
110220	F	1	910911	14:12	10	58	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a	0.70 a	1.00 b	1.20 b
110221	C	1	910916	12:15	1	30	0.36 f	0.33 f	0.23 f	0.60 a	0.07 f	0.05 f	0.60 a	0.60 a

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EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP	DDDPP	DDEOP	DDEPP	DDTOP	DDTPP	SUMPEST
110015	C	1	910916	10:40	15	56	3.23	12.39	0.52 f	4.45 b	0.60 a	2.22	26.71
110015	D	1	910916	10:40	15	54	0.18 f	0.60 a	0.60 a	0.49 f	0.60 a	41.47	63.50
110017	A	1	910916	11:30	17	44	0.60 a	1.12 b	0.60 a	0.68 f	0.60 a	1.70 b	8.97
110017	B	1	910916	11:30	17	53	5.55	0.60 a	0.60 a	1.94 f	3.12	102.10	141.92
110017	C	1	910916	11:30	17	50	0.60 a	0.60 a	0.60 a	0.99 f	2.11	0.60 a	28.52
110019	A	1	910916	14:00	19	53	0.60 a	2.27	0.60 a	0.92 f	0.34 f	26.34	65.89
110019	A	2	910916	14:00	19	53	0.60 a	3.03	0.60 a	0.96 f	0.60 a	34.90	57.51
110019	B	1	910916	14:00	19	56	1.78 b	9.01	0.60 a	2.25 b	0.60 a	78.36	124.24
110019	C	1	910916	14:00	19	51	1.23 b	0.60 a	0.60 a	2.16 b	5.64	144.51	195.56
110021	A	1	911115	11:00	21	43	0.60 a	1.49 b	2.00 a	1.40 b	0.21 f	1.43 b	17.22
110021	B	1	911115	11:00	21	39	0.60 a	1.15 b	0.60 a	2.00 a	0.62 b	0.67 b	11.79
110021	B	2	911115	11:00	21	39	0.60 a	0.90 b	0.60 a	2.00 a	0.41 f	0.87 b	17.22
110021	C	1	911115	11:00	21	38	0.60 a	0.60 a	0.60 a	2.00 a	0.60 a	0.60 a	8.42
110021	D	1	911115	11:00	21	30	0.60 a	0.60 a	0.60 a	2.00 a	0.60 a	0.60 a	13.09
(M) SEDIMENT GRAB													
110210	B	1	910909	14:09	19	52	0.60 a	0.60 a	0.60 a	1.80	0.60 a	0.60 a	9.60
110210	D	1	910909	14:45	19	51	0.60 a	0.60 a	0.60 a	2.20	0.60 a	4.00	13.40
110210	E	1	910909	15:00	19	51	0.60 a	2.40	0.60 a	1.30 b	0.60 a	0.60 a	10.90
110210	F	1	910909	15:08	19	48	0.60 a	2.20	0.60 a	1.30 b	0.60 a	1.10 b	11.20
110211	C	1	910909	16:05	18	5	3.58	17.72	0.33 f	5.98 b	1.29 b	15.46	48.82
110211	C	2	910909	16:05	18	5	3.85	20.43	0.36 f	4.81 b	1.66 b	18.42	54.47
110212	C	1	910910	10:30	16	24	0.32 f	1.04 b	0.60 a	0.48 f	0.48 f	10.03	16.15
110213	C	1	910910	08:30	21	28	0.21 f	1.02 b	0.05 f	0.89 f	0.60 a	4.99	10.26
110214	C	1	910910	12:45	14	11	0.60 a	0.95 b	0.36 f	0.70 f	0.51 f	7.00	12.77
110215	C	1	910910	11:35	15	51	0.85 b	4.24	0.61 b	3.18 b	0.60 a	12.08	27.98
110216	C	1	910910	14:15	11	38	0.42 f	0.60 a	0.27 f	1.11 f	0.60 a	7.60	14.21
110217	B	1	910910	15:25	17	41	0.60 a	1.60 b	0.60 a	1.00 b	0.60 b	0.60 a	9.80
110217	D	1	910910	15:40	17	39	0.60 a	3.30	0.60 a	1.30 b	0.60 a	14.00	25.20
110217	E	1	910910	15:55	17	41	0.60 a	2.30	0.60 a	1.30 b	9.50	0.60 a	19.70
110217	F	1	910910	16:10	17	47	0.60 a	2.90	0.60 a	1.60 b	0.60 a	1.00 b	12.50
110218	C	1	910911	10:55	12	35	1.44 b	2.79	0.77 b	1.25 f	2.47	90.48	123.85
110219	C	1	910911	12:30	13	45	0.79 b	0.60 a	0.24 f	2.30 b	0.60 a	0.60 a	11.06
110220	B	1	910911	13:45	10	55	0.70 a	2.50	1.30 b	2.60	0.70 a	1.50 b	14.90
110220	D	1	910911	13:55	10	60	0.80 a	2.80 a	0.80 b	2.70	0.80	1.80 b	16.10
110220	E	1	910911	14:07	10	52	0.60 a	1.90	0.60 a	1.90	0.60 a	1.10 b	11.50
110220	F	1	910911	14:12	10	58	0.70 a	2.80	1.40 b	2.20	0.70 a	2.40	16.60
110221	C	1	910916	12:15	1	30	0.13 f	0.79 b	0.22 f	0.65 f	0.60 a	0.60 a	5.82

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	ALDRIN	ACHLOR	TNONACHL	HEPCHLOR	HEPCHLEPX	HCB	LINDANE	MIREX
110222	C	1	910911	16:55	4	61	1.26 b	1.36 b	0.91 b	0.14 f	0.15 f	0.39 f	0.75 a	0.75 a
110223	C	1	910912	09:55	20	22	0.82 b	0.60 a	0.20 f	0.60 a	0.60 a	2.40 f	0.12 f	0.60 a
110225	B	1	910912	14:05	8	69	1.00 a	1.00 b	1.00 a	1.00 a	1.00 a	7.20	1.00 a	1.70 b
110225	D	1	910912	14:20	8	61	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a
110225	E	1	910912	14:35	8	65	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a
110225	F	1	910912	14:50	8	59	1.80 b	0.70 a	0.70 a	0.70 a	0.90 b	1.20 b	0.70 a	0.70 a
110226	B	1	910912	15:05	7	68	1.80 b	0.80 b	0.90 a	0.90 a	0.90 a	0.90 a	0.90 a	1.40 b
110226	D	1	910912	15:20	7	66	0.90 a	1.30 b	0.80 a	0.90 a	0.90 a	0.90 b	0.90 a	1.70 a
110226	D	2	910912	15:20	7	59	0.90 a	1.60 b	1.10 b	0.90 a	0.90 a	0.90 a	0.90 a	1.90 b
110226	E	1	910912	15:35	7	64	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a
110226	F	1	910912	15:50	7	63	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a	0.80 a
110227	C	1	910913	12:35	23	29	0.72 b	0.12 f	0.10 f	0.02 f	0.03 f	0.12 f	0.04 f	0.60 a
110228	C	1	910913	13:50	22	27	0.64 b	0.10 f	0.11 f	0.03 f	0.02 f	0.12 f	0.06 f	0.60 a
110229	C	1	910916	10:05	9	36	6.04	1.09 b	0.31 f	0.60 a	0.36 f	0.86 b	1.03 b	0.60 a
110230	C	1	910916	11:20	2	52	0.59 f	0.85 b	0.55 f	0.07 f	0.11 f	0.22 f	0.60 a	0.60 a
110232	C	1	910912	10:05	5	45	0.81 b	0.44 f	0.51 f	0.32 f	0.06 f	0.24 f	0.60 a	0.60 a
110232	C	2	910912	10:05	5	45	0.36 f	0.39 f	0.60 a	0.50 f	0.18 f	0.23 f	0.60 a	0.60 a
(N) SEEP														
112325	A	1	920213	12:30	S1		0.09 f	0.60 a	0.60 a	0.01 f	0.00 f	0.01 f	0.03 f	0.60 a
112325	B	1	920213	12:30	S1		0.10 f	0.60 a	0.60 a	0.01 f	0.00 f	0.60 a	0.03 f	0.60 a
112325	B	2	920213	12:30	S1		0.10 f	0.60 a	0.60 a	0.01 f	0.00 f	0.03 f	0.02 f	0.60 a
112326	A	1	920213	12:20	S2		0.10 f	0.60 a	0.60 a	0.01 f	0.60 a	0.60 a	0.03 f	0.60 a
112327	A	1	920213	12:15	S3		0.06 f	0.60 a	0.60 a	0.01 f	0.00 f	0.60 a	0.02 f	0.60 a

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	%H2O	DDDOP	DDDPP	DDEOP	DDEPP	DDTOP	DDTPP	SUMPEST
110222	C	1	910911	16:55	4	61	1.03 b	3.69	0.46 f	2.66 b	0.75 a	14.11	28.40
110223	C	1	910912	09:55	20	22	0.19 f	0.60 f	0.60 a	0.41 f	0.60 a	0.60 b	8.93
110225	B	1	910912	14:05	8	69	2.60 b	16.00	1.90 b	5.30	2.00 b	6.80	49.50
110225	D	1	910912	14:20	8	61	0.80 b	5.50	0.80 b	2.40	0.80 a	4.80	21.50
110225	E	1	910912	14:35	8	65	2.00 b	7.90	2.20 b	3.80	0.80 a	2.80	25.90
110225	F	1	910912	14:50	8	59	1.50 b	6.70	0.70 a	2.90	0.80 b	2.20	22.20
110226	B	1	910912	15:05	7	68	2.80	14.00	2.20 b	6.40	4.20	0.90 a	39.00
110226	D	1	910912	15:20	7	66	2.70 b	10.00	1.80 b	4.70	2.30 b	3.30	33.10
110226	D	2	910912	15:20	7	59	3.10	13.50	2.60 b	5.20	2.00 b	2.80	38.30
110226	E	1	910912	15:35	7	64	1.60 b	0.90 b	1.50 b	5.00	0.90 b	4.40	20.70
110226	F	1	910912	15:50	7	63	1.50 b	7.70	0.90 b	3.40	1.00 b	2.30 b	23.20
110227	C	1	910913	12:35	23	29	0.22 f	0.60 a	0.60 a	0.33 f	0.23 f	6.91	10.64
110228	C	1	910913	13:50	22	27	0.60 a	0.55 f	0.09 f	0.22 f	0.60 a	5.05	8.79
110229	C	1	910916	10:05	9	36	1.36 b	4.56	0.60 a	1.97 b	3.73	59.78	82.88
110230	C	1	910916	11:20	2	52	0.73 b	3.49	0.44 f	2.19 b	0.60 a	11.79	22.84
110232	C	1	910912	10:05	5	45	0.87 b	3.69	0.06 f	1.87 f	0.68 b	9.61	20.35
110232	C	2	910912	10:05	5	45	1.82 b	3.98	0.33 f	2.13 b	0.60 f	11.21	23.51
(N) SEEP													
112325	A	1	920213	12:30	S1		0.60 a	0.60 a	0.60 a	0.01 f	0.60 a	0.60 a	4.95
112325	B	1	920213	12:30	S1		0.60 a	0.60 a	0.60 a	0.01 f	0.60 a	0.60 a	5.55
112325	B	2	920213	12:30	S1		0.60 a	0.60 a	0.60 a	0.01 f	0.60 a	0.60 a	4.97
112326	A	1	920213	12:20	S2		0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	0.60 a	6.74
112327	A	1	920213	12:15	S3		0.60 a	0.60 a	0.60 a	0.01 f	0.60 a	0.60 a	5.49

5. METALS

VARIABLE	DESCRIPTION	VARIABLE	DESCRIPTION
%SOLIDS	Percent Solids		
Al	Aluminum	Pb	Lead
As	Arsenic	Mn	Manganese
Cd	Cadmium	Hg	Mercury
Cr	Chromium	Ni	Nickel
Cu	Copper	Ag	Silver
Fe	Iron	Zn	Zinc

DATA QUALIFIER CODES:

a	Analyte was not detected below the method detection limit (MDL) shown.
B	Reported value was below the limit of quantification (LOQ).
c	Not reported due to matrix interference.
d	Not quantified.
e	Not reported.
f	Reported value was below the MDL.
h	Quantification was based on alternate internal standard.
j	Analysis was performed with selected ion monitoring.
p	Value shown may be biased because recovery of the analyte in reference material was outside the desired range.
U	Analyte was not detected at the instrument detection limit.

ADDITIONAL FLAGS ALLOWED:

N	The spike recovery was out of control.
S	The sample was analyzed by method of standard addition.
W	The analytical spike was outside of 85-115% recovery image.
*	The duplicate was out of control.
+	The standard addition correlation was less than 0.995.

METALS DATA (ug/g) AND DATA FLAGS

EPAID	CDATE	CTIME	STA	%SOLIDS	Al	As	Cd	Cr	Cu	Fe
(A) EELGRASS LEAVES										
110030A1	910909	11:30	32	100.0	1230.00	3.20 BN	1.40	7.90	9.30	2750.0
110031A1	910909	12:15	30	100.0	635.00	3.30 BN	1.40	3.90	6.70	3290.0
110032A1	910909	12:55	31	100.0	903.00	5.70 BN	1.80	6.60	8.50	3890.0
110033A1	910911	09:40	28	100.0	2790.00	3.30 BN	0.44	14.30	12.00	4280.0
110034A1	910912	09:15	24	100.0	1350.00	1.90 BN	0.48	8.00	12.30	2390.0
110035A1	910912	10:10	25	100.0	3370.00	4.10 B	1.10	19.90	17.50 N	5280.0
110036A1	910912	11:20	27	100.0	5130.00	6.20 B	1.70	29.60	18.60 N	8900.0
110040A1	910913	10:30	22	100.0	319.00	0.69 BW	1.10	1.10	3.50 N	562.0
110041A1	910913	11:40	23	100.0	2510.00	3.50 B	1.80	5.80	8.50 N	3870.0
110042A1	910916	13:30	3	85.0	858.00	1.10 B	2.60 S	4.50	12.00	1220.0
110043A1	910917	13:50	9	100.0	4280.00	7.10 B	1.70	25.20	13.40 N	7180.0
110044A1	910917	14:30	19	90.5	1150.00	3.80 BN+	1.60 N	7.40	12.50	2480.0
110045A1	910920	14:45	1	100.0	337.00	0.91 BW	0.73	2.50	5.30 N	634.0
110046A1	910920	16:00	2	100.0	2970.00	5.90 B	0.92	20.50	11.70 N	6610.0
110047A1	910924	08:05	11	100.0	3670.00 *	5.10 B*	1.20	22.30 *	15.50 N	6480.0 *
110048A1	910924	09:10	16	100.0	524.00 *	3.40 B*	1.30	2.70 *	7.20 N	987.0 *
110049A1	910924	10:10	15	100.0	5060.00 *	0.43 UA*	0.84	26.90 *	19.10 N	9110.0 *
110050A1	910930	12:10	18	100.0	8380.00 *	7.40 B*	1.20	38.80 *	21.40 N	12100.0 *
110051A1	910930	13:30	17	100.0	2030.00 *	3.10 B*	0.87	10.70 *	18.30 N	3910.0 *
110052A1	911002	13:30	14	100.0	1200.00 *	2.60 B*	0.88	6.60 *	9.90 N	2110.0 *
110037A1	911002	15:30	29	100.0	998.00 *	5.00 B*	1.60	5.70 *	11.70 N	3760.0 *
110038A1	911002	16:30	33	100.0	764.00 *	3.20 B*	3.10	4.10 *	8.30 N	1390.0 *
110053A1	911022	16:30	12A	90.5	345.00	1.70 BNS	1.70 NS	2.20 B	16.40	620.0
110360A1	911217	07:30	1	100.0	432.00 *	0.06 UaNW	0.62 *	3.00 N	12.10 N*	934.0 *
110361A1	911217	09:30	12A	100.0	164.00 *	0.04 UaNW	1.70 *+	1.30 N	28.40 N*	526.0 *
110362A1	911217	11:00	18	100.0	391.00 *	0.03 UaNW	0.79 *	2.20 N	21.30 N*	1160.0 *
110363A1	911217	11:45	19	100.0	702.00 *	1.10 BN	0.91 *	4.70 N	16.50 N*	2220.0 *
110364A1	911217	12:00	3	100.0	209.00 *	0.05 UaNW	1.10 *S	1.60 N	17.40 N*	654.0 *
110365A1	911217	12:30	9	100.0	280.00	0.68 BNW	0.51	1.70	15.60	614.0
110367A1	911217	15:30	17	100.0	332.00	3.50 BN	0.46	2.40	17.10	295.0
110368A1	911218	13:40	23	100.0	113.00	3.40 BN	0.44	0.63 B	5.20	243.0
110369A1	920310	07:40	16	15.3	9.10	0.62 BW	1.30	0.31 B	30.20	58.3
110370A1	920310	08:40	17	14.1	32.60	1.20 B	0.57	0.52 B	17.00	396.0
110371A1	920310	09:00	3	15.6	120.00	0.80 BW	1.00	0.93	9.90	517.0
110372A1	920310	09:45	18	17.6	54.00	1.10 BW	0.99	0.41 B	8.80	590.0
110373A1	920310	10:00	19	11.7	58.10	0.66 BW	0.73	0.65 B	20.10	265.0
110374A1	920310	10:43	12A	13.2	24.10	0.72 BW	0.25 BW	0.58 B	62.60	232.0
110375A1	920310	11:15	9	14.1	62.00	1.40 B	1.20	0.60 B	9.80	337.0
110376A1	920317	13:40	1	16.5	37.50	0.68 BW	0.53	0.52 B	12.10	117.0
110377A1	920326	13:50	23	17.9	66.30	0.89 BW	1.90	0.45 B	9.80	137.0

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb		Mn		Hg		Ni		Ag		Zn	
(A) EELGRASS LEAVES																
110030A1	910909	11:30	32	100.0	12.90		3220.00		0.14		6.30		0.37	N*	82.60	
110031A1	910909	12:15	30	100.0	5.40		2610.00		0.17		3.50		0.52	N*+	76.40	
110032A1	910909	12:55	31	100.0	13.70		5360.00		0.04	B	6.10		0.30	N*+	95.40	
110033A1	910911	09:40	28	100.0	17.30	S	1110.00		0.04	B	4.20		0.81	N*	114.00	
110034A1	910912	09:15	24	100.0	7.10		413.00		0.05	B	3.20		0.62	N*S	102.00	
110035A1	910912	10:10	25	100.0	14.50		630.00		0.08	B	7.70	N	1.10	N	87.90	
110036A1	910912	11:20	27	100.0	14.90		974.00		0.08		7.20	N	0.51	BN W	106.00	
110040A1	910913	10:30	22	100.0	1.20		138.00		0.02	B	1.00	BN	0.56	N MW	27.00	
110041A1	910913	11:40	23	100.0	7.00		255.00		0.01	U	5.30	N	0.61	BN W	43.70	
110042A1	910916	13:30	3	85.0	6.60		317.00		0.04	B	3.00		0.45	S	80.10	*
110043A1	910917	13:50	9	100.0	20.50		524.00		0.07	B	6.40	N	0.60	BN	71.90	
110044A1	910917	14:30	19	90.5	13.40		314.00		0.04	B	2.90		0.53	NS	67.40	
110045A1	910920	14:45	1	100.0	3.70		109.00		0.03	B	1.10	BN	0.33	BN W	37.30	
110046A1	910920	16:00	2	100.0	15.90		166.00		0.03	B	4.70	N	0.79	N W	47.90	
110047A1	910924	08:05	11	100.0	18.60	*	519.00		0.03	B	6.90	*	0.81	W	72.90	*
110048A1	910924	09:10	16	100.0	5.10	*	546.00		0.02	B	1.80	*	0.33	BW	61.30	*
110049A1	910924	10:10	15	100.0	24.20	*	494.00		0.08	B	7.90	*	1.10	W	78.60	*
110050A1	910930	12:10	18	100.0	34.60	*	787.00		0.08		11.00	*	0.59	BW	94.90	*
110051A1	910930	13:30	17	100.0	13.50	*	332.00		0.08		3.80	*	0.79	B	71.00	*
110052A1	911002	13:30	14	100.0	8.50	*	262.00		0.01	B	2.90	*	0.86		46.50	*
110037A1	911002	15:30	29	100.0	12.20	*	3140.00		0.04	B	5.20	*	0.71		99.50	*
110038A1	911002	16:30	33	100.0	10.10	*	330.00		0.04	B	7.70	*	0.47	B	126.00	*
110053A1	911022	16:30	12A	90.5	7.90		173.00		0.05	Bf	1.70	Bf	0.16	UfNS	60.50	
110360A1	911217	07:30	1	100.0	0.48		77.60	N*	0.03	B	2.50	BN	0.26	*	72.00	*
110361A1	911217	09:30	12A	100.0	0.34		121.00	N*	0.03	B	3.40	N	0.80	*	62.00	*
110362A1	911217	11:00	18	100.0	0.64		155.00	N*	0.03	B	1.90	N	6.90	*+	58.90	*
110363A1	911217	11:45	19	100.0	0.54		52.40	N*	0.04	B	2.80	N	0.68	*	62.40	*
110364A1	911217	12:00	3	100.0	0.29		56.90	N*	0.05	B	1.70	BN	0.99	*	53.60	*
110365A1	911217	12:30	9	100.0	5.50		140.00		0.02	B	2.10	B	1.30	N*	67.30	
110367A1	911217	15:30	17	100.0	4.80		53.60		0.04	B	1.50	B	1.40	N*+	46.40	
110368A1	911218	13:40	23	100.0	1.50		69.40		0.02	B	1.20	B	0.10	N*+	38.80	
110369A1	920310	07:40	16	15.3	0.89		201.00		0.01	BN	2.30		1.10	N	65.50	
110370A1	920310	08:40	17	14.1	1.30	W	55.10		0.02	UN	1.10	B	0.72	N	60.50	
110371A1	920310	09:00	3	15.6	1.40		71.00		0.01	BN	2.10		0.61	NW	56.50	
110372A1	920310	09:45	18	17.6	2.10		111.00		0.02	BN	0.63	B	0.53	NMW	66.80	
110373A1	920310	10:00	19	11.7	0.80	B	14.30		0.01	UN	1.10	B	1.10	N	73.00	
110374A1	920310	10:43	12A	13.2	1.10		14.20		0.01	UN	0.37	B	0.77	NW	60.20	
110375A1	920310	11:15	9	14.1	1.50		60.30		0.01	UN	1.80	B	1.00	N	79.20	
110376A1	920317	13:40	1	16.5	1.00		75.30		0.01	BN	1.70		0.60	N	51.40	
110377A1	920326	13:50	23	17.9	1.30		265.00		0.01	BN	1.10	B	0.36	BN	60.60	

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Al		As		Cd		Cr		Cu		Fe	
(B) EELGRASS ROOTS																
110030C1	910909	11:30	32	100.0	1560.00		6.20	BN	0.41		12.90		7.20		6860.0	
110031C1	910909	12:15	30	100.0	1160.00		2.50	BN	0.33		7.70		6.20		3520.0	
110032C1	910909	12:55	31	100.0	931.00		5.50	BN	0.57		8.80		8.60		5540.0	
110033C1	910911	09:40	28	100.0	2800.00		9.70	BNS	0.34		20.20		15.10		9010.0	
110034C1	910912	09:15	24	100.0	2030.00		5.10	B	0.53		15.20		10.60	N	4640.0	
110035C1	910912	10:10	25	100.0	4070.00		7.80	B	0.62		23.50		14.40	N	8330.0	
110036C1	910912	11:20	27	100.0	6860.00		9.90	B	0.57		42.80		17.30	N	12900.0	
110040C1	910913	10:30	22	100.0	985.00		1.50	B	0.47		3.10		2.80	N	1730.0	
110041C1	910913	11:40	23	100.0	1180.00		2.10	B	0.57		3.40		4.80	N	2060.0	
110042C1	910916	13:30	3	88.0	1060.00		2.50	BN	0.39	N	6.70		4.40		2200.0	
110043C1	910917	13:50	9	100.0	2870.00		4.80	B	0.55		16.50		10.90	N	5030.0	
110044C1	910917	14:30	19	90.5	3110.00		3.20	BN	0.53	BN	21.80		16.90		5540.0	
110045C1	910920	14:45	1	100.0	755.00		1.50	B	0.34		5.30		4.50	N	1620.0	
110046C1	910920	16:00	2	100.0	2310.00		6.10	B	0.43		21.00		10.80	N	6270.0	
110047C1	910924	08:05	11	100.0	868.00	*	3.60	B*	0.42		5.90	*	10.40	N	2480.0	*
110048C1	910924	09:10	16	100.0	1480.00	*	6.70	B*	0.39		9.40	*	11.80	N	4010.0	*
110049C1	910924	10:10	15	100.0	2850.00	*	4.40	B*	0.49		17.10	*	15.60	N	6540.0	*
110050C1	910930	12:10	18	100.0	1660.00	*	4.20	B*	0.37		8.40	*	13.10	N	4340.0	*
110051C1	910930	13:30	17	100.0	1800.00	*	4.20	B*	0.46		12.50	*	13.70	N	5280.0	*
110052C1	911002	13:30	14	100.0	1890.00	*	5.10	B*	0.77		12.30	*	10.30	N	4380.0	*
110037C1	911002	15:30	29	100.0	1240.00	*	6.30	B*	0.82		8.40	*	9.10	N	6450.0	*
110038C1	911002	16:30	33	100.0	1620.00	*	4.10	B*	1.00		12.20	*	9.40	N	5800.0	*
110360C1	911217	07:30	1	100.0	763.00	*	0.05	BNW	0.26	*	5.10	N	5.40	N*	2050.0	*
110361C1	911217	09:30	12A	100.0	705.00	*	0.04	UaN	0.26	*W	5.10	N	16.20	N*	2430.0	*
110362C1	911217	11:00	18	100.0	759.00	*	0.05	UaN	0.23	B*	5.40	N	20.80	N*	4420.0	*
110363C1	911217	11:45	19	100.0	1440.00	*	4.10	BN	0.42	*	12.50	N	13.30	N*	4310.0	*
110364C1	911217	12:00	3	100.0	494.00	*	0.05	UaN	0.50	*S	4.50	N	8.80	N*	1910.0	*
110365C1	911217	12:30	9	100.0	711.00		5.30	BN	0.35		5.40		10.30		4250.0	
110367C1	911217	15:30	17	100.0	1080.00		5.80	BN	0.28		15.00		15.40		4140.0	
110368C1	911218	13:40	23	100.0	682.00		3.00	BN	0.32		2.40		4.50		1500.0	
110369C1	920310	07:40	16	9.9	635.00		3.80	B	0.65		4.20		15.50		2290.0	
110370C1	920310	08:40	17	12.0	203.00		2.30	B	0.30	B	2.40		18.90		2450.0	
110371C1	920310	09:00	3	12.1	938.00		4.80	B	0.54		8.10		8.30		5940.0	
110372C1	920310	09:45	18	9.7	713.00		5.30	B	0.65	B	4.30		14.20		4900.0	
110373C1	920310	10:00	19	7.8	627.00		3.50	B	0.63	B	9.70		34.00		4600.0	
110374C1	920310	10:43	12A	7.8	384.00		2.90	B	0.30	B	3.50		36.70		3210.0	
110375C1	920310	11:15	9	9.2	744.00		10.90	B	0.50	BW	4.50		8.90		6200.0	
110376C1	920317	13:40	1	10.5	213.00		1.50	BW	0.30	BW	1.70		8.80		1280.0	
110377C1	920326	13:50	23	10.7	742.00		2.30	B	0.81		2.50		13.30		1750.0	

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb		Mn		Hg		Ni		Ag		Zn	
(B) EELGRASS ROOTS																
110030C1	910909	11:30	32	100.0	9.10		124.00		0.20		3.10	B	0.49	N*+	34.20	
110031C1	910909	12:15	30	100.0	7.60		335.00		0.28		3.20		0.46	N*S	26.00	
110032C1	910909	12:55	31	100.0	6.70	+	439.00		0.04	B	2.30	B	0.82	N*	31.40	
110033C1	910911	09:40	28	100.0	16.20		123.00		0.08	B	5.10		0.72	N*	53.60	
110034C1	910912	09:15	24	100.0	9.30		58.30		0.11		4.00	N	0.21	BN W	43.20	
110035C1	910912	10:10	25	100.0	14.10		166.00		0.02	B	6.50	N	0.81	N M	55.80	
110036C1	910912	11:20	27	100.0	22.40		175.00		0.08	B	10.00	N	1.00	N	71.70	
110040C1	910913	10:30	22	100.0	2.70		26.60		0.01	B	2.20	N	0.42	BN W	17.30	
110041C1	910913	11:40	23	100.0	4.70		44.20		0.02	B	3.00	N	0.20	BN W	18.30	
110042C1	910916	13:30	3	88.0	8.30	S	33.60		0.11	B	1.90		0.30	N	20.10	
110043C1	910917	13:50	9	100.0	15.60		215.00		0.04	U	4.30	N	0.47	N W	46.00	
110044C1	910917	14:30	19	90.5	24.00		76.20		0.16		5.60		0.44	UfNS	48.40	
110045C1	910920	14:45	1	100.0	4.50		20.50		0.11		1.50	BN	0.47	BN	15.10	
110046C1	910920	16:00	2	100.0	16.30		55.70		0.10		3.80	N	0.92	N	39.50	
110047C1	910924	08:05	11	100.0	5.60	*	56.90		0.05	B	2.70	*	0.77	W	30.90	*
110048C1	910924	09:10	16	100.0	13.40	*	120.00		0.04	B	3.90	*	0.67	BW	37.50	*
110049C1	910924	10:10	15	100.0	19.70	*	95.30	*	0.09		4.90	*	0.53	W	43.40	*
110050C1	910930	12:10	18	100.0	14.70	*	78.70		0.06	B	3.30	*	0.57		39.30	*
110051C1	910930	13:30	17	100.0	10.90	*	47.90		0.04	B	3.30	*	0.69		45.10	*
110052C1	911002	13:30	14	100.0	12.80	*	46.40		0.14		3.90	*	0.77		34.00	*
110037C1	911002	15:30	29	100.0	7.80	*	121.00		0.06	B	2.90	*	1.20		42.20	*
110038C1	911002	16:30	33	100.0	7.50	*	143.00		0.05	B	2.90	*	0.96		41.60	*
110360C1	911217	07:30	1	100.0	0.41		15.70	N*	0.03	B	1.50	BN	0.13	*	25.30	*
110361C1	911217	09:30	12A	100.0	0.75		46.30	N*	0.03	B	2.30	N	11.60	*+	32.90	*
110362C1	911217	11:00	18	100.0	0.66		67.20	N*	0.04	B	2.40	BN	0.41	*	49.80	*
110363C1	911217	11:45	19	100.0	1.00		30.40	N*	0.03	B	3.40	N	0.61	*	39.70	*
110364C1	911217	12:00	3	100.0	0.43		14.50	N*	0.13		1.90	BN	0.36	*	28.80	*
110365C1	911217	12:30	9	100.0	13.00	S	78.40		0.03	B	2.40	B	0.39	N*	48.00	
110367C1	911217	15:30	17	100.0	10.80		31.90		0.07	B	2.60		2.10	N*S	41.90	
110368C1	911218	13:40	23	100.0	2.80		19.30		0.02	B	2.00	B	0.05	BN*W	20.50	
110369C1	920310	07:40	16	9.9	11.50		240.00		0.03	BN	2.60		0.30	BNW	61.50	
110370C1	920310	08:40	17	12.0	4.10		18.60		0.02	BN	1.50	B	0.70	NM	40.70	
110371C1	920310	09:00	3	12.1	5.40		26.50		0.05	BN	2.90		0.80	N	36.10	
110372C1	920310	09:45	18	9.7	14.00		79.20		0.02	BN	1.80	B	0.69	BNW	54.80	
110373C1	920310	10:00	19	7.8	10.60		20.20		0.04	BN	3.00	B	0.89	BNW	75.90	
110374C1	920310	10:43	12A	7.8	7.60		20.60		0.02	BN	1.50	B	1.40	N	45.30	
110375C1	920310	11:15	9	9.2	7.60		57.60		0.05	BN	2.50	B	1.10	N	64.50	
110376C1	920317	13:40	1	10.5	1.70		15.40		0.02	BN	1.10	B	0.63	BN	24.20	
110377C1	920326	13:50	23	10.7	3.80		40.20		0.01	UN	2.10		0.18	UN	32.70	

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Al	As	Cd	Cr	Cu	Fe
(C) FLOUNDER FLESH										
110183A1	910925	08:00	T4	20.0	6.10 B	8.20 BS	0.02 B	0.60 B	1.10 B	22.8
110182A1	910925	08:45	T7	25.0	5.00 B	7.00 B S	0.04 UfW	1.30 B	0.97 B	15.1
110184A1	910925	10:10	T9	21.1	6.80	3.70 B	0.01 UaW	0.43 B	0.89 B	26.0
110181A1	910925	13:50	T5	23.4	11.00	4.10 B	0.05 W	1.10	1.50	27.5
110186A1	910926	08:50	T3	21.5	4.20 B	6.20 B+	0.01 Ua	0.56 B	0.69 B	9.4
110185A1	910926	10:32	T6	20.3	13.20	7.60 BS	0.02 Ua	0.69 B	1.10 B	25.9
110187A1	910926	12:36	T8	20.0	4.60 B	8.10 B	0.03 Uf	0.74 B	1.10 B	9.5
(D) FLOUNDER LIVER										
110186B1	910926	08:50	T3	35.7	2.70 B	2.10 BW	0.09	0.40 B	22.00	183.0
(E) FUCOID										
110142A1	910916	13:15	3	88.2	56.10 *	7.10 BN+	0.28 *	0.75 BN	6.70 N*	169.0 *
110143A1	910916	14:30	19	88.7	188.00	26.80 BN	0.70 NS	0.97	6.30	244.0
110144A1	910918	12:50	9	84.9	74.60 *	2.10 BN	0.78 *S	0.63 BN	31.40 N*	221.0 *
110145A1	910918	13:00	8	84.6	171.00	22.20 BN	0.37 N	0.93	14.40	236.0
110146A1	910918	13:30	10	86.0	49.20	27.90 BN	0.47 N	0.74 B	13.60	151.0
110147A1	910918	14:00	17	85.2	62.00 *	2.50 BN	0.26 *	0.78 BN	6.60 N*	159.0 *
110148A1	910927	08:30	10A	85.7	37.30 *	12.60 BN+	0.28 *	0.63 BN	29.70 N*	143.0 *
110149A1	910927	09:30	10A	83.6	30.20	21.80 BN	0.82 NS	0.30 B	22.50	54.7
110141A1	911007	18:00	22	83.6	15.30 *	5.70 BN+	0.27 *	0.40 BN	1.60 N*	113.0 *
(F) LOBSTER HEPATOPANCREAS										
110150B1	910923	09:10	T2	47.5	17.60	13.20 B	11.70	0.92 B	167.00	72.2
110153B1	910925	08:00	T4	34.4	23.30	13.30 B+	14.20	0.62 B	375.00	108.0
110152B1	910925	08:45	T7	45.9	9.70	9.80 B+	4.70	0.43 B	89.00	60.2
110154B1	910925	10:10	T9	26.8	52.60	55.50 B	28.20	1.10	776.00	211.0
110151B1	910925	13:50	T5	49.2	10.50	29.10 B+	4.40	0.48 B	99.50	52.2
110156B1	910926	08:50	T3	53.3	7.10	10.70 B	3.90	0.27 B	39.80	48.1
110156C1	910926	08:50	T3	39.3	24.10	10.60 B+	25.30 +	0.55 B	281.00	114.0
110155B1	910926	10:32	T6	42.3	30.40	21.10 B+	25.00 +	0.59 B	139.00	119.0
110157B1	910926	12:36	T8	40.0	10.50	14.30 B	6.70	0.88	420.00	116.0
(G) LOBSTER TAIL FLESH										
110153A1	910925	08:00	T4	19.0	96.30	15.10 BS	0.04 B	1.30 B	21.60	289.0
110152A1	910925	08:45	T7	20.6	12.30	12.40 B	0.03 B	0.70 B	28.40	22.9
110151A1	910925	13:50	T5	21.8	9.70	13.40 B	0.01 B	0.60 B	26.50	18.2
110156A1	910926	08:50	T3	23.3	14.90	7.80 B	0.02 Ua	0.81 B	25.10	40.1
110156D1	910926	08:50	T3	21.7	55.60	3.60 B	0.05 B	0.85 B	22.90	97.4
110157A1	910926	12:36	T8	20.8	9.10	25.30 B	0.03 B	0.65 B	27.40	10.7

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb	Mn	Hg	Ni	Ag	Zn
(C) FLOUNDER FLESH										
110183A1	910925	08:00	T4	20.0	0.15 *W	0.44 B	0.14 B	0.77 B	0.03 Ua*	30.20
110182A1	910925	08:45	T7	25.0	0.38	3.10	0.04 U	0.50 Bf	0.04 UfW	42.10 *
110184A1	910925	10:10	T9	21.1	0.07 *W	0.62	0.07 B	0.75 B	0.02 Ua*M	27.00
110181A1	910925	13:50	T5	23.4	0.21 +	2.50	0.15 Bf	0.61 Bf	0.02 UfMW	41.10 *
110186A1	910926	08:50	T3	21.5	0.05 B*W	0.39 B	0.09 B	0.54 B	0.04 B*	24.40
110185A1	910926	10:32	T6	20.3	0.16 *W	0.76		0.87 B	0.07 B*	33.40
110187A1	910926	12:36	T8	20.0	0.08	0.33 B	0.11 Bf	0.76 Bf	0.02 UfMW	34.50
(D) FLOUNDER LIVER										
110186B1	910926	08:50	T3	35.7	0.24 *	1.80		0.53 B	0.66 *	114.00
(E) FUCOID										
110142A1	910916	13:15	3	88.2	1.00	38.90 N*	0.01 U	1.00 BN	0.23 *	60.00 *
110143A1	910916	14:30	19	88.7	1.70 +	53.10	0.04 B	0.67 B	0.32 NS	53.10
110144A1	910918	12:50	9	84.9	0.60	97.70 N*	0.03 B	3.90 N	0.65 *+	136.00 *
110145A1	910918	13:00	8	84.6	2.00 S	60.00	0.07 B	2.40	0.06 UfN+	197.00
110146A1	910918	13:30	10	86.0	1.30 +	118.00	0.04 Bf	1.10 B	0.53 N	62.80
110147A1	910918	14:00	17	85.2	0.76 W	30.20 N*	0.01 B	1.10 BN	0.12 *	65.00 *
110148A1	910927	08:30	10A	85.7	0.49	34.10 N*	0.04 B	3.20 N	1.20 *	163.00 *
110149A1	910927	09:30	10A	83.6	13.30	11.40	0.08 B	2.20	0.84 N	68.20
110141A1	911007	18:00	22	83.6	0.12 B W	21.20 N*	0.01 U	1.20 BN	0.07 *	37.60 *
(F) LOBSTER HEPATOPANCREAS										
110150B1	910923	09:10	T2	47.5	0.11 B*	6.00		2.40 B	1.40 *	43.70
110153B1	910925	08:00	T4	34.4	0.22 *	8.20	0.20 B	1.70	1.60 *	105.00
110152B1	910925	08:45	T7	45.9	0.12	8.10	0.11 B	0.42 Bf	0.39 BS	65.90 *
110154B1	910925	10:10	T9	26.8	0.85 *+	16.20	0.72	2.60	1.40 *S	109.00
110151B1	910925	13:50	T5	49.2	0.11	5.10	0.13 B	0.88 B	2.80 +	30.20 *
110156B1	910926	08:50	T3	53.3	0.17 *	4.80	0.10 B	0.48 B	0.77 *	27.90
110156C1	910926	08:50	T3	39.3	0.12 *+	7.70	0.12 B	1.20	1.80 *	71.60
110155B1	910926	10:32	T6	42.3	0.36 *S	7.30	0.12 B	1.10 B	2.60 *	73.50
110157B1	910926	12:36	T8	40.0	0.48 S	9.10	0.28 B	1.40	0.24 Uf	168.00 *
(G) LOBSTER TAIL FLESH										
110153A1	910925	08:00	T4	19.0	0.61 *S	4.00	0.93	0.91 B	0.91 *S	78.10
110152A1	910925	08:45	T7	20.6	0.10 W	1.60	1.50	0.17 Uf	0.33	92.70
110151A1	910925	13:50	T5	21.8	0.04 BW	2.80	1.60 B	0.19 Bf	0.76	84.00
110156A1	910926	08:50	T3	23.3	0.19 *W	2.60		1.10 B	0.97 *	68.20
110156D1	910926	08:50	T3	21.7	0.18 *+	4.90	1.07	0.71 B	0.42 *+	65.20
110157A1	910926	12:36	T8	20.8	0.06	3.60	1.40 B	0.32 Bf	0.68	96.20

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Al	As	Cd	Cr	Cu	Fe
(H) MUSSEL										
110061A1	910910	08:00	28	13.2	388.00	13.50 B +	2.00 *	4.40	8.50	638.0
110070A1	910912	07:30	17	12.1	345.00	5.70 B	1.10 *	3.30	7.00	619.0
110071A1	910912	08:00	20	11.7	452.00	7.60 B	1.50 *	4.40	7.90	820.0
110072A1	910912	08:25	21	14.0	650.00	7.90 B	9.30 *+	5.80	7.40	1300.0
110073A1	910916	12:00	1	11.9	342.00	9.60 B	1.00 *	3.90	6.20	576.0
110074A1	910916	12:45	14	12.0	302.00	10.70 B S	1.50 *	3.80	5.80	579.0
110062A1	910920	17:20	27	10.5	193.00	8.00 B	2.50 *	5.10	8.20	489.0
110076A1	910923	07:15	11	13.5	273.00 *	7.30 B	1.70 N	4.10	7.80	680.0
110077A1	910923	08:00	16	13.7	190.00 *	5.90 B	2.10 N	3.90	6.20	487.0
110078A1	910927	07:45	19	5.5	245.00	9.70 B	3.00 S	3.90	6.50	671.0
110079A1	910927	08:15	10A	12.0	76.90 *	5.10 B	1.90 N	2.30	6.20	209.0
110080A1	910930	09:40	3	7.9	215.00	27.80 B	2.80 +	3.00	6.30	450.0
110081A1	910930	10:20	5	13.2	231.00 *	7.40 B	2.20 N	4.20	5.80	476.0
110082A1	910930	10:55	7	15.4	294.00 *	6.30 B	1.60 N	3.40	7.50	627.0
110083A1	910930	11:30	8	15.1	203.00 *	6.90 B	1.90 N	4.00	8.40	526.0
110084A1	910930	11:55	9	13.2	165.00 *	6.70 B	2.60 N	3.70	6.10	426.0
110063A1	910930	13:00	25	10.8	305.00	6.50 B	2.00 *	3.80	7.00	655.0
110075B1	911001	11:45	2	13.5	201.00 *	5.30 B	1.50 N	3.10	5.80	515.0
110064A1	911001	12:45	24	11.4	581.00	9.30 B	1.90 *	6.20	9.10	1070.0
110085A1	911003	12:05	6	14.0	237.00 *	8.80 B	1.90 N	3.70	8.40	573.0
110086A1	911003	13:00	4	13.5	348.00 *	10.50 B	0.10 UNW	4.00	7.60	617.0
110087A1	911003	13:30	18	14.8	235.00 *	9.10 B+	1.90 N	3.00	4.80	566.0
110088A1	911004	07:58	22	14.5	197.00 *	3.90 U+	1.40 N	2.00	6.00	341.0
110089A1	911004	09:24	23	15.4	221.00 *	3.50 U+	1.40 N	2.20	6.20	403.0
110060C1	911010	08:50	26	9.8	508.00	11.10 B S	4.30 *	8.60	11.40	1190.0
110090A1	911022	15:00	10	11.3	522.00	8.40 B	2.00	3.40	8.10	497.0
110092A1	911022	15:30	12A	10.3	289.00	7.60 B	2.40 *	3.80	6.60	732.0
110091A1	911022	16:00	12	9.8	280.00	6.50 B	3.10 *	3.50	32.30	536.0
110390A1	911217	07:30	1	9.1	151.00	8.80 B	2.10 *	3.10 B	5.40	349.0
110391A1	911217	09:30	12A	8.3	268.00	8.60 B	4.00 *	3.50	12.70	643.0
110392A1	911217	15:00	17	11.5	198.00	4.40 B	1.10 *	2.70 B	5.70	362.0
110393A1	911218	13:30	23	11.3	147.00	6.00 B	1.70 *	1.70 B	6.20	349.0
110394A1	911219	14:15	9	9.8	127.00	6.60 B	1.30 *S	2.80	5.60	303.0
110395A1	911219	14:30	3	9.5	276.00	7.30 B	1.70 *S	3.40	5.30	532.0
110396A1	911219	14:45	19	9.8	179.00	7.10 B	1.40 *S	3.40	4.70	470.0
110397A1	911219	15:15	18	9.4	232.00	8.90 B	1.70 *S	3.70	7.20	678.0
110398A1	920310	07:40	16	11.8	398.00	5.50 B	1.20	3.60	7.90	870.0
110399A1	920310	08:40	17	11.1	406.00	5.10 B	1.20	3.90	6.50	898.0
110400A1	920310	10:40	12A	11.7	433.00	4.60 B	1.20	4.00	7.70	1100.0
110401A1	920317	12:40	1	11.7	459.00	6.80 B	1.20	4.30	5.90	874.0
110402A1	920318	14:40	9	13.2	170.00	4.80 B	1.50	3.10	5.30	401.0
110403A1	920318	15:08	3	12.1	118.00	4.50 B	1.20	2.60	5.00	320.0

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb		Mn	Hg		Ni		Ag		Zn	
(H) MUSSEL															
110061A1	910910	08:00	28	13.2	2.80		31.00	0.29	BN	1.90	B	1.90		142.00	
110070A1	910912	07:30	17	12.1	6.10		12.30	0.15	BN	1.70	B	2.40		97.60	
110071A1	910912	08:00	20	11.7	6.70		17.90	0.26	BN	2.10	B	2.60		134.00	
110072A1	910912	08:25	21	14.0	6.40		15.50			2.10	B	0.12	B	125.00	
110073A1	910916	12:00	1	11.9	7.60		9.10			1.50	Ba	0.18		116.00	
110074A1	910916	12:45	14	12.0	5.70		13.30	0.72	BN	1.70	B	0.13		89.00	
110062A1	910920	17:20	27	10.5	5.80		82.10	0.46	BN	2.60	B	1.20		140.00	
110076A1	910923	07:15	11	13.5	9.20		9.50	0.27	BN	1.60	B	0.15		119.00	
110077A1	910923	08:00	16	13.7	9.10		11.10	0.07	BaN	1.70	B	0.07	B	110.00	
110078A1	910927	07:45	19	5.5	7.40	S	14.50	0.96		2.80	B	0.10	B	110.00	
110079A1	910927	08:15	10A	12.0	26.00		17.50	0.13	BaN	1.50	B	0.04	B	122.00	
110080A1	910930	09:40	3	7.9	5.50		15.20	0.49		2.00	B	0.08	BW	108.00	
110081A1	910930	10:20	5	13.2	10.80		16.60	0.44	BN	1.90	B	0.06	B	109.00	
110082A1	910930	10:55	7	15.4	10.70		8.80	0.24	BN	2.40	B	0.85		107.00	
110083A1	910930	11:30	8	15.1	12.30		37.70	0.18	BN	3.10	B	2.70		119.00	
110084A1	910930	11:55	9	13.2	10.20		12.60	0.34	BN	1.60	B	0.06	B	132.00	
110063A1	910930	13:00	25	10.8	3.90		20.90	0.35	BN	2.00	B	1.20		120.00	
110075B1	911001	11:45	2	13.5	10.00		12.10	0.49	BN	1.40	B	0.08		140.00	
110064A1	911001	12:45	24	11.4	5.80		21.50	0.50	BN	2.70	B	2.20		134.00	
110085A1	911003	12:05	6	14.0	9.00		11.10	0.16	BN	1.80	B	1.20		132.00	
110086A1	911003	13:00	4	13.5	10.30		10.10	0.22	BN	1.40	B	0.61		130.00	
110087A1	911003	13:30	18	14.8	11.50		9.70	0.19	BN	1.40	B	0.05	B	103.00	
110088A1	911004	07:58	22	14.5	1.90		10.00	0.11	BaN	1.00	Ba	0.07	B	89.40	
110089A1	911004	09:24	23	15.4	2.50		7.60	0.44	BN	1.30	B	0.07	B	78.30	
110060C1	911010	08:50	26	9.8	5.90		115.00	0.20	BN	3.10	B	2.80		125.00	
110090A1	911022	15:00	10	11.3	13.50		72.00	0.97		1.40	B	0.03	Uf	222.00	
110092A1	911022	15:30	12A	10.3	9.20		13.70	0.26	B	2.00	B	0.05	BN	117.00	
110091A1	911022	16:00	12	9.8	11.00	S	27.10	0.45	B	2.30	B	0.07	BNW	105.00	
110390A1	911217	07:30	1	9.1	3.80		6.60	0.34	B	1.20	B	0.16	BN	84.20	
110391A1	911217	09:30	12A	8.3	7.10		10.90	0.36	B	1.60	B	0.32	NW	143.00	
110392A1	911217	15:00	17	11.5	2.10	S	9.90	0.39	B	1.50	B	0.05	UNW	83.30	
110393A1	911218	13:30	23	11.3	1.40		7.50	0.18	B	0.83	B	0.16	NW	94.90	
110394A1	911219	14:15	9	9.8	6.10	S	8.00	0.41	B	0.89	B	0.08	BNW	109.00	
110395A1	911219	14:30	3	9.5	6.60		10.80	0.51	B	1.10	B	0.09	BNW	109.00	
110396A1	911219	14:45	19	9.8	6.20	S	8.20	0.49	B	1.00	B	0.06	BNW	73.30	
110397A1	911219	15:15	18	9.4	9.70		10.80	0.44	B	0.85	B	0.05	BNW	89.90	
110398A1	920310	07:40	16	11.8	4.10		21.10	0.53	B	2.90	B	0.12	BW	123.00	N
110399A1	920310	08:40	17	11.1	7.50	+	16.30	0.30	B	2.70	B	0.10	B	99.50	N
110400A1	920310	10:40	12A	11.7	12.40		15.40	0.60		3.00	B	0.08	B	104.00	N
110401A1	920317	12:40	1	11.7	7.10		12.40	0.52		2.50	B	0.16		87.40	N
110402A1	920318	14:40	9	13.2	5.40		9.60	0.27	B	2.00	B	0.09	B	73.60	N
110403A1	920318	15:08	3	12.1	3.50		8.60	0.32	B	1.70	B	0.07	B	59.50	N

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Al	As	Cd	Cr	Cu	Fe
(H) MUSSEL (cont.)										
110404A1	920318	15:35	19	11.9	310.00	5.90 B	1.80	4.00	6.20	763.0
110405A1	920318	16:19	18	12.0	203.00	6.10 B	2.00	3.70	6.30	700.0
110406A1	920318	16:19	23	12.9	159.00	7.50 BS	1.20	1.80 B	7.10	404.0
(I) OYSTER										
110060A1	910910	07:30	26	11.6	134.00	4.30 B	6.80	2.60	257.00	347.0
110065A1	911004	15:10	31	11.1	415.00	8.80 BS	3.70	3.80	208.00	698.0
110066A1	911004	15:25	29	13.0	336.00	5.80 BS	3.50	3.10	187.00	580.0
110061B1	911010	09:45	28	11.4	87.30	5.00 B	4.30	2.20 B	301.00	234.0
(J) POSTDEPLOYMENT MUSSELS										
798951A1	911023		2	16.0	153.00	8.10 BN	1.10	2.60	8.10	405.0
798952A1	911023		2	17.0	134.00	7.90 BaN	0.76	2.60 B	6.30	357.0
798953A1	911023		2	14.8	128.00	8.50 BN	1.10	2.40	7.40	397.0
798955A1	911023		8	15.8	156.00	11.30 BNS	0.87	2.40 B	7.10	390.0
798956A1	911023		8	18.0	150.00	10.00 BaN	0.89	2.30 B	7.20	336.0
798957A1	911023		8	15.7	219.00	10.60 BN	1.60	3.30	10.60	489.0
798963A1	911023		15	15.4	155.00	10.00 BaN	1.30	2.40	8.40	427.0
798964A1	911023		15	18.5	101.00	11.50 BNS	1.30	1.80	6.80	278.0
798965A1	911023		15	16.1	136.00	16.10 BN+	1.30	2.30	5.50	381.0
798967A1	911023		19	20.0	153.00	7.20 BN	0.84	2.00	3.90	374.0
798968A1	911023		19	16.7	77.60	10.10 BNS	1.00	1.40 B	4.80	247.0
798969A1	911023		19	17.6	142.00	8.30 BN	0.90	1.80	5.60	351.0
798971A1	911023		22	15.3	128.00	8.50 BN	1.20	1.80	6.70	357.0
798972A1	911023		22	17.5	149.00	17.70 BN+	1.20	1.70	6.90	382.0
798973A1	911023		22	15.4	130.00	9.80 BS	1.70 S	1.50 B	7.10	412.0
(K) PREDEPLOYMENT MUSSELS										
798975A1	910918			14.5	79.00	10.50 B	0.90 *	2.40 B	5.80	367.0
798976A1	910918			13.8	124.00	11.10 B	0.78 *	3.70 B	6.60	397.0
798977A1	910918			15.8	92.80	9.60 B	0.72 *	2.00 B	6.50	349.0

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb	Mn	Hg	Ni	Ag	Zn
(H) MUSSEL (cont.)										
110404A1	920318	15:35	19	11.9	5.00	11.50	0.59	2.20 B	0.10 B	88.70 N
110405A1	920318	16:19	18	12.0	11.60	11.50	0.55 B	2.00 B	0.09 B	100.00 N
110406A1	920318	16:19	23	12.9	1.80	10.00	0.30 B	1.40 B	0.11 B	76.00 N
(I) OYSTER										
110060A1	910910	07:30	26	11.6	0.85	16.30	0.20 Ba	2.70 B	17.60 *	5080.00
110065A1	911004	15:10	31	11.1	1.30	21.60	0.17 Ba	4.10 B	19.90 *	5830.00
110066A1	911004	15:25	29	13.0	1.10	22.60	0.07 Ba	2.70 B	12.30 *S	4620.00
110061B1	911010	09:45	28	11.4	0.61	9.60	0.19 Ba	3.00 B	22.60 *	7100.00
(J) POST DEPLOYMENT MUSSELS										
798951A1	911023		2	16.0	2.80	7.90	0.14 B	1.80 B	0.80 *	83.20
798952A1	911023		2	17.0	2.40	8.90	0.13 Ba	1.80 Ba	0.36 *	87.00
798953A1	911023		2	14.8	2.70	10.60	0.12 B	1.80 B	0.80 *	101.00
798955A1	911023		8	15.8	2.60	9.10	0.19 Ba	1.50 Ba	0.65 *	70.70
798956A1	911023		8	18.0	2.20	10.20	0.08 Ba	2.00 B	0.42 *	60.80
798957A1	911023		8	15.7	3.80	10.30	0.13 B	1.90 B	2.10 *	114.00
798963A1	911023		15	15.4	4.60 S	11.40	0.17 B	1.30 Ba	0.93 *	92.40
798964A1	911023		15	18.5	2.20	7.90	0.17 B	1.50 B	0.44 *	70.50
798965A1	911023		15	16.1	3.80 S	9.70	0.09 Ba	1.60 B	0.64 *S	80.00
798967A1	911023		19	20.0	1.90	8.90	0.08 Ba	1.40 B	0.46 *	61.50
798968A1	911023		19	16.7	1.90	5.50	0.08 Ba	1.50 B	0.41 *S	63.30
798969A1	911023		19	17.6	1.90	9.20	0.11 Ba	1.20 B	0.34 *	53.50
798971A1	911023		22	15.3	2.30	11.20	0.17 B	1.30 B	0.52 *S	82.00
798972A1	911023		22	17.5	2.40	10.10	0.07 Ba	1.30 B	0.38 *	77.60
798973A1	911023		22	15.4	2.90 *S	10.50	0.10 B	2.20 B	0.89 *	72.60
(K) PRE DEPLOYMENT MUSSELS										
798975A1	910918			14.5	3.40	9.50	0.05 U	0.76 B	2.00 N	75.10
798976A1	910918			13.8	1.90	10.90	0.06 B	1.80 B	1.40 N	81.50
798977A1	910918			15.8	1.60	11.00	0.07 B	0.60 U	0.56 N	76.20

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Al	As	Cd	Cr	Cu	Fe
(L)SEDIMENT CORE										
110015B1	910916	10:40	15	71.4	30100.00	5.50 B	0.55	111.00	21.50	19900.0
110015C1	910916	10:40	15	54.5	26800.00	9.00 B	0.80	129.00	27.90	21800.0
110015D1	910916	10:40	15	57.9	22600.00	11.00 B	0.67 W	66.10	22.20	21300.0
110017A1	910916	11:30	17	69.4	18600.00	10.70 B	0.42	73.90	25.60	16600.0
110017B1	910916	11:30	17	62.2	29800.00	9.80 B	0.36 W	58.80	20.70	18900.0
110017C1	910916	11:30	17	50.0	24800.00	5.60 B*	0.18 BN	57.60	15.00 B	23300.0
110014A1	910916	12:30	14	71.6	21800.00	6.90 B MW	0.30 U W	37.50	6.70 B	12800.0
110014B1	910916	12:30	14	85.0	24000.00	3.50 B	0.18 BW	32.40	4.30 B	13300.0
110014C1	910916	12:30	14	88.2	19800.00	7.00 B	0.20 BW	37.50	6.40 B	16800.0
110019A1	910916	14:00	19	47.1	27400.00	9.50 B*	0.50 N	113.00	30.00	26800.0
110019B1	910916	14:00	19	43.5	32500.00	7.70 B*	0.65 N	163.00	32.30	25700.0
110019C1	910916	14:00	19	49.3	15500.00	5.10 B*	0.26 BNW	56.60	13.90	23000.0
110004A1	910916	14:30	4	34.5	72700.00	17.00 S	0.62 B	186.00	1.30 U	39300.0
110004B1	910916	14:30	4	35.5	38600.00	18.30 NS	0.83 *	208.00	42.00 *	36500.0
110003A1	910918	10:30	3	52.5	47500.00	5.90 S	0.35 B	81.60	0.63 U	18600.0
110003B1	910918	10:30	3	53.3	54200.00	4.50 B+	0.30 B	91.80	0.67 U	20600.0
110005A1	910918	11:10	5	40.0	45000.00	12.30 N	0.79 *	189.00	57.10 *	34700.0
110005B1	910918	11:10	5	37.5	31700.00	9.10 N	0.88 *	242.00	54.20 *	33400.0
110005C1	910918	11:10	5	34.2	40100.00	9.70 N	1.10 *	335.00	82.70 *	35700.0
110007A1	910918	11:30	7	34.8	31300.00 *	12.20 N	0.85	168.00	43.30 *	32100.0 *
110007B1	910918	11:30	7	44.0	31800.00 *	8.70 N	0.82	241.00	65.60 *	31800.0 *
110007C1	910918	11:30	7	77.8	17900.00 *	6.80 BN	0.07 UaW	47.80	11.60 *	21800.0 *
110008A1	910918	12:00	8	41.1	11000.00 *	13.80 N	0.98	165.00	67.00 *	29200.0 *
110008B1	910918	12:00	8	38.8	18000.00 *	9.40 N	1.10	199.00	82.20 *	30700.0 *
110006A1	910918	12:30	6	36.4	37000.00	17.10 NS	0.71 *	192.00	44.10 *	38100.0
110006B1	910918	12:30	6	76.1	19900.00	7.50 N	0.08 U*	79.00	20.90 *	29400.0
110001A1	910919	09:45	1	72.4	31300.00	2.20	0.15 B	48.30	0.64 U	11100.0
110001B1	910919	09:45	1	69.0	30500.00	3.10 S	0.16 B	50.20	0.46 U	11400.0
110010A1	910926	10:00	10	49.2	21600.00 *	10.00 N	0.73 W	151.00	99.20 *	50300.0 *
110010B1	910926	10:00	10	45.8	16700.00 *	14.30 N	0.72	154.00	474.00 *	34000.0 *
110010C1	910926	10:00	10	48.9	56300.00	16.60 B	0.56 B	149.00	160.00	55000.0
110010D1	910926	10:00	10	46.9	37200.00	12.30 B	0.83 B	183.00	111.00	47600.0
110010E1	910926	10:00	10	54.8	52100.00	11.40 B	0.90 B W	288.00	531.00	80700.0
110012A1	910926	11:00	12	63.8	30000.00	9.90 B	0.35 U W	87.30	105.00	17900.0
110012B1	910926	11:00	12	64.2	35500.00	10.70 B	0.45 B W	144.00	161.00	22500.0
110012C1	910926	11:00	12	46.7	47300.00	17.30 B	0.92 B W	186.00	265.00	33800.0
110021A1	911115	11:00	21	61.0	34600.00	8.00 B	0.25 B	121.00	17.10 B	21200.0
110021B1	911115	11:00	21	64.4	28300.00	3.70 B	0.19 B	47.80	6.50 B	18000.0
110021C1	911115	11:00	21	61.5	33100.00	4.80	0.12 B	48.60	0.64 U	20400.0
110021D1	911115	11:00	21	70.5	31000.00	5.00	0.12 B	46.60	0.62 U	18900.0

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb	Mn	Hg	Ni	Ag	Zn
(L) SEDIMENT CORE										
110015B1	910916	10:40	15	71.4	49.00	308.00 *	0.14 B	27.60	0.51 W	79.40
110015C1	910916	10:40	15	54.5	88.00	212.00 *	0.54 B	23.20	0.71 W	104.00
110015D1	910916	10:40	15	57.9	95.40	191.00 *	0.22 Ua	23.70	0.60 BW	97.90
110017A1	910916	11:30	17	69.4	48.00	232.00 *	0.16 B	19.00	0.32 BW	90.80
110017B1	910916	11:30	17	62.2	67.40	256.00 *	0.15 Ua	18.40	0.30 BW	82.40
110017C1	910916	11:30	17	50.0	45.40	256.00 N*	0.39 UaN	23.30	0.19 UaW	62.10
110014A1	910916	12:30	14	71.6	27.40	306.00	0.12 Ua	11.10	0.89 B W	41.20
110014B1	910916	12:30	14	85.0	16.90	260.00 *	0.13 Ua	15.90	0.12 Ua	60.00
110014C1	910916	12:30	14	88.2	15.90	194.00 *	0.14 Ua	19.60	0.13 UaW	41.90
110019A1	910916	14:00	19	47.1	46.30	310.00 N*	0.20 UaN	29.00	0.61 W	112.00
110019B1	910916	14:00	19	43.5	51.00	326.00 N*	0.22 UaN	28.80	0.80	113.00
110019C1	910916	14:00	19	49.3	34.70	254.00 N*	0.19 UaN	25.90	0.19 BW	66.90
110004A1	910916	14:30	4	34.5	65.50	519.00 N	0.43 UN	38.00	1.00 BW	150.00
110004B1	910916	14:30	4	35.5	87.60	327.00 N	0.31 UN	40.50	0.86 B	300.00 *
110003A1	910918	10:30	3	52.5	43.50	327.00 N	0.28 UN	19.80	0.34 BW	77.20
110003B1	910918	10:30	3	53.3	48.80	382.00 N	0.22 UN	23.50	0.39 B	78.80
110005A1	910918	11:10	5	40.0	84.20	337.00 N	0.32 UN	44.50	0.93 B	149.00 *
110005B1	910918	11:10	5	37.5	105.00	331.00 N	0.26 UN	38.40	0.89	163.00 *
110005C1	910918	11:10	5	34.2	123.00	332.00 N	0.41 UN	45.70	1.20 B	164.00 *
110007A1	910918	11:30	7	34.8	54.00	261.00 *	0.28 UaN	33.70	0.50 BN	133.00 *
110007B1	910918	11:30	7	44.0	68.00	305.00 *	0.22 UaN	38.20	1.00 N	172.00 *
110007C1	910918	11:30	7	77.8	14.30 B	199.00 *	0.14 UaN	24.90	0.13 UaN	54.20 *
110008A1	910918	12:00	8	41.1	73.40	163.00 *	0.24 UaN	36.40	0.67 BN	149.00 *
110008B1	910918	12:00	8	38.8	98.40	182.00 *	0.23 UaN	36.00	0.46 BN	159.00 *
110006A1	910918	12:30	6	36.4	84.10	413.00 N	0.23 UN	44.10	0.65 B	155.00 *
110006B1	910918	12:30	6	76.1	22.00	204.00 N	0.16 UN	39.00	0.15 U	74.60 *
110001A1	910919	09:45	1	72.4	19.80	160.00 N	0.21 UN	11.10	0.19 U	36.10
110001B1	910919	09:45	1	69.0	20.90	154.00 N	0.15 UN	12.80	0.14 U	33.40
110010A1	910926	10:00	10	49.2	45.70	187.00 *	0.27 UaN	91.20	0.45 BN	148.00 *
110010B1	910926	10:00	10	45.8	96.20	159.00 *	0.22 UaN	39.50	0.23 BN	163.00 *
110010C1	910926	10:00	10	48.9	84.30	465.00	0.19 Ua	53.90	0.84 UaW	167.00
110010D1	910926	10:00	10	46.9	105.00	428.00	0.34 B	48.10	0.49 B	175.00
110010E1	910926	10:00	10	54.8	422.00	421.00	0.16 Ua	88.10	0.73 UaW	1950.00
110012A1	910926	11:00	12	63.8	124.00	304.00	0.19 B	24.50	0.34 B W	530.00
110012B1	910926	11:00	12	64.2	235.00	364.00	0.51 B	44.40	0.62 UaW	728.00
110012C1	910926	11:00	12	46.7	355.00	395.00	1.90 B	34.50	1.30	471.00
110021A1	911115	11:00	21	61.0	46.80	228.00 N	0.25 UaN	21.90	0.43 B	76.60
110021B1	911115	11:00	21	64.4	31.00	208.00 N	0.15 UaN	17.00	0.14 Ua	47.60
110021C1	911115	11:00	21	61.5	11.50	249.00 N	0.21 UN	18.20	0.19 U	52.00
110021D1	911115	11:00	21	70.5	12.50	278.00 N	0.21 UN	15.00	0.19 U	43.70

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Al		As		Cd		Cr	Cu		Fe
(M) SEDIMENT GRAB														
110210B1	910909	14:09	19	47.5	48800.00		11.30	S	0.62		85.70	30.80	*	27500.0
110210D1	910909	14:45	19	48.5	44400.00		12.10	S	0.65		83.30	36.30	*	28800.0
110210E1	910909	15:00	19	48.9	36700.00		11.00	W	0.56	B	93.20	36.30	*	21600.0
110210F1	910909	15:08	19	52.3	40600.00		11.90		0.53	B	71.30	28.20	*	25700.0
110211C1	910909	16:05	18	94.8	20100.00		7.00	NS	2.00	*	56.20	35.10	*	15300.0
110213C1	910910	08:30	21	73.6	37600.00		3.90	B	0.19	B	81.10	12.50	B	17900.0
110212C1	910910	10:30	16	75.9	11900.00		5.80	BN	0.06	UaNW	32.40	3.30	B*	10200.0
110215C1	910910	11:35	15	48.8	38500.00		17.70	N	0.28	BN	108.00	22.50	*	25800.0
110215G1	910910	12:20	15	100.0	19200.00		4.30	B*	0.17	BN	51.70	13.40		12700.0
110214C1	910910	12:45	14	88.6	11200.00		3.10	BN	0.06	BN	31.10	1.80	B*	7450.0
110216C1	910910	14:15	11	62.2	22500.00		4.40	N	0.22	BW	69.30	13.90		16000.0
110217B1	910910	15:25	17	58.4	33300.00		12.40		0.56	B	94.20	42.30	*	20800.0
110217D1	910910	15:40	17	61.0	23300.00		7.00	S	0.47	B	83.30	26.50	*	18100.0
110217E1	910910	15:55	17	59.0	36700.00		11.50		0.39	B	66.40	24.90	*	19400.0
110217F1	910910	16:10	17	52.7	30600.00		11.30		0.44	B	74.30	36.50	*	22400.0
110218C1	910911	10:55	12	65.2	28300.00		17.80	N	0.14	BN	75.30	91.10	*	19400.0
110219C1	910911	12:30	13	55.4	31400.00		9.90	N	0.29	BN	81.20	28.00	*	19700.0
110220B1	910911	13:45	10	45.1	29300.00		12.10	N*S	0.46		93.50	58.10		23400.0
110220D1	910911	13:55	10	39.7	37700.00		13.10	N*	0.43		102.00	53.90		26600.0
110220E1	910911	14:07	10	47.5	48100.00		15.70	N*+	0.53		105.00	84.10		27100.0
110220F1	910911	14:12	10	41.8	41900.00		2.90	N*	0.62		109.00	52.40		29000.0
110222C1	910911	16:55	4	38.6	44700.00		28.70	BN	0.57	BW	174.00	55.40		33400.0
110223C1	910912	09:55	20	80.0	36900.00		2.10	U	0.12	B	39.90	3.50	B	13700.0
110232C1	910912	10:05	5	100.0	22600.00		16.00	N	0.21	BW	64.10	19.40		12900.0
110224C1	910912	13:15	6	40.0	77900.00		20.70	BN	0.88	W	211.00	59.00		40000.0
110225B1	910912	14:05	8	31.0	46200.00		17.60	N*S	0.94	S	145.00	71.40		35700.0
110225D1	910912	14:20	8	38.9	27900.00		14.80	N*	0.76		151.00	43.80		29400.0
110225E1	910912	14:35	8	35.2	39500.00		15.20	N*	0.80		151.00	48.30		30700.0
110225F1	910912	14:50	8	41.2	25600.00		14.10	N*	0.89	S	145.00	43.30		28600.0
110226B1	910912	15:05	7	32.1	56800.00	*	17.10	*	0.96	N	192.00	92.40	N*	34500.0
110226D1	910912	15:20	7	33.8	36400.00	*	17.00	*	0.70	N	164.00	47.00	N*	33100.0
110226E1	910912	15:35	7	34.1	25800.00	*	19.40	*	0.97	N	87.30	35.70	N*	15800.0
110226F1	910912	15:50	7	37.5	33000.00	*	19.60	*	1.10	N	205.00	87.40	N*	36100.0
110227C1	910913	12:35	23	73.6	20700.00		0.27	Ua	0.07	Ua	34.00	1.60	Ba	9250.0
110228C1	910913	13:50	22	74.5	16700.00		1.20	Ua	0.06	Ua	21.70	0.99	Ba	5450.0
110229C1	910916	10:05	9	64.2	23900.00		12.30	BN	0.15	BW	64.50	18.00		15800.0
110230C1	910916	11:20	2	48.3	31700.00		13.00	N	0.27	N	99.80	22.40	*	22800.0
110221C1	910916	12:15	1	70.0	27400.00		2.10	BN	0.23	BN	47.40	2.70	Ba*	9910.0
110231F1	910916	14:50	3	56.7	28900.00	*	8.30	*	0.35	N	65.80	26.00	N*	15400.0

(Contd)

EPAID	CDATE	CTIME	STA	%SOLIDS	Pb	Mn	Hg	Ni	Ag	Zn
(M) SEDIMENT GRAB										
110210B1	910909	14:09	19	47.5	81.90	421.00	0.24 Bf	25.60	0.48 BW	98.90
110210D1	910909	14:45	19	48.5	67.60	415.00	0.11 Uf	30.60	0.52 B	90.30
110210E1	910909	15:00	19	48.9	60.30	320.00	0.21 Uf	20.20	0.46 BW	101.00
110210F1	910909	15:08	19	52.3	50.80	385.00	0.18 Bf	27.70	0.41 BW	84.90
110211C1	910909	16:05	18	94.8	86.60	169.00 N	0.10 UN	20.10	0.21 B	76.90 *
110213C1	910910	08:30	21	73.6	41.30	265.00 N	0.24 UaN	15.30	0.40 BW	61.80
110212C1	910910	10:30	16	75.9	19.80	162.00	0.13 UaN	12.40	0.11 UaW	25.00 *
110215C1	910910	11:35	15	48.8	106.00	284.00	0.22 UaN	25.20	0.81	100.00 *
110215G1	910910	12:20	15	100.0	24.10	174.00 N*	0.12 UN	12.20	0.48	53.50
110214C1	910910	12:45	14	88.6	17.90	191.00	0.10 UaN	8.40	0.28 BW	22.40 *
110216C1	910910	14:15	11	62.2	43.40 *	285.00	0.15 UaN	15.20	0.27 BW	62.00
110217B1	910910	15:25	17	58.4	88.30	291.00	0.38 Bf	21.30	0.45 BW	152.00
110217D1	910910	15:40	17	61.0	68.70	235.00	0.32 Bf	19.30	0.38 BW	112.00
110217E1	910910	15:55	17	59.0	54.90	328.00	0.19 Bf	18.10	0.35 BW	83.70
110217F1	910910	16:10	17	52.7	119.00	337.00	0.67 Bf	24.40	0.35 BW	120.00
110218C1	910911	10:55	12	65.2	122.00	254.00	0.27 UaN	27.60	0.37 BW	378.00 *
110219C1	910911	12:30	13	55.4	35.00	244.00	0.19 UaN	19.90	0.59 W	85.00 *
110220B1	910911	13:45	10	45.1	75.60	308.00	0.32 BfN	26.40	0.65 BN	108.00
110220D1	910911	13:55	10	39.7	57.00	348.00	0.26 BfN	40.50	0.74 BN	113.00
110220E1	910911	14:07	10	47.5	72.10	372.00	0.19 BfN	27.70	0.65 BN	115.00
110220F1	910911	14:12	10	41.8	56.40	361.00	0.20 BfN	28.70	0.64 BN	116.00
110222C1	910911	16:55	4	38.6	82.40 *	382.00	0.58 UaN	35.60	0.92 W	140.00
110223C1	910912	09:55	20	80.0	17.20	344.00 N	0.21 UaN	12.70	0.18 UaW	35.40
110232C1	910912	10:05	5	100.0	30.90 *	158.00	0.24 UaN	12.70	0.33 BW	55.40
110224C1	910912	13:15	6	40.0	104.00 *	526.00	0.27 BN	39.30	0.96	177.00
110225B1	910912	14:05	8	31.0	77.50	542.00	0.21 BfN	39.30	0.84 BN	168.00
110225D1	910912	14:20	8	38.9	49.70	339.00	0.29 BfN	30.20	0.84 BN	125.00
110225E1	910912	14:35	8	35.2	54.90	362.00	0.31 BfN	36.10	0.90 BN	135.00
110225F1	910912	14:50	8	41.2	63.70	338.00	0.26 BfN	31.20	0.78 BN	126.00
110226B1	910912	15:05	7	32.1	92.80 *	385.00	0.16 BfN	37.00	1.10 B	206.00
110226D1	910912	15:20	7	33.8	42.90 *	328.00	0.15 UfN	33.90	0.96 B	148.00
110226E1	910912	15:35	7	34.1	89.70 *	177.00	0.67 BfN	17.70	1.20 B	95.80
110226F1	910912	15:50	7	37.5	66.80 *	332.00	0.22 BfN	41.40	1.30 B	204.00
110227C1	910913	12:35	23	73.6	14.60	135.00 N	0.13 UaN	11.10	0.12 UaW	21.70
110228C1	910913	13:50	22	74.5	25.20 S	73.60 N	0.12 UaN	7.50	0.11 UaW	17.30
110229C1	910916	10:05	9	64.2	55.60 *	354.00	0.15 UaN	18.80	0.25 BW	69.60
110230C1	910916	11:20	2	48.3	61.90	242.00	0.19 UaN	21.70	0.74 M	82.00 *
110221C1	910916	12:15	1	70.0	0.12 Ua	130.00	0.12 UaN	11.00	0.24 BW	38.70 *
110231F1	910916	14:50	3	56.7	22.70 *	244.00	0.09 UfN	14.90	0.35 B	61.40

6. WATER CONCENTRATION OF INORGANIC ELEMENTS

VARIABLE	DESCRIPTION
SAL	Salinity (PPT)
Al	Aluminum
Ag	Silver
As	Arsenic
Cd	Cadmium
Cr	Chromium
Cu	Copper
Fe	Iron
Hg	Mercury
Mn	Manganese
Ni	Nickel
Pb	Lead
Zn	Zinc

DATA QUALIFIER CODES:

a Analyte was not detected below the method detection limit (MDL) shown.
b Reported value was below the limit of quantification (LOQ).
c Not reported due to matrix interference.
d Not quantified.
e Not reported.
f Reported value was below the MDL.
h Quantification was based on alternate internal standard.
j Analysis was performed with selected ion monitoring.
p Value shown may be biased because recovery of the analyte in reference material was outside the desired range.
u Analyte was not detected at the instrument detection limit.

WATER CHEMISTRY (µg/L) and DATA FLAGS

EPAID	CDATE	CTIME	STA	SAL	Al	As	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn
(A) SEEP																
112327A1	920213	12:15	S3		476.00	2.00 u	4.00 f	2.00 f	7.00 f	447.00	8.00 f	6.00 f	0.07 f	6.00 f	3.00 u	54.00 f
112326A1	920213	12:20	S2		2143.00	1.40 f	2.00 f	8.00 f	310.00 b	3013.00	972.00	115.00	0.88 b	15.00 f	3.00 u	216.00
112326A2	920213	12:20	S2		2161.00	2.60 f	2.00 f	9.00 f	313.00 b	3071.00	1034.00	116.00	0.90 b	13.00 f	3.00 u	219.00
112325A1	920213	12:30	S1		38.00 f	2.00 u	3.00 f	6.00 u	3.00 u	436.00	1.00 u	313.00	0.06 f	3.00 f	3.00 u	4.00 f
112325B1	920213	12:30	S1		43.00 f	2.00 u	4.00 f	6.00 u	3.00 u	465.00	1.00 u	320.00	0.06 f	9.00 f	3.00 u	5.00 f
(B) WATER																
110100B1	910913	10:35	22		44.00 f	2.00 u	2.00 f	6.00 u	3.00 u	59.00 f	1.00 f	4.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110101B1	910913	11:35	23	31.9	45.20 f	1.60 f	4.00 u	6.00 u	3.00 u	30.50 f	1.00 u	4.00 f	0.04 u	5.30 f	3.00 u	5.00 u
110102B1	910916	11:40	2	30.0	69.20 b	2.30 f	4.00 u	6.00 u	2.80 f	79.40 f	1.30 f	5.70 f	0.04 u	10.00 u	3.00 u	10.80 f
110103B1	910916	11:15	3	29.5	23.70 f	2.00 f	4.00 u	6.00 u	3.00 u	3.00 f	0.50 f	5.50 f	0.04 u	10.00 u	3.00 u	17.60 f
110104B1	910916	11:22	5	30.0	45.50 f	2.00 u	4.00 u	6.00 u	3.00 u	30.60 f	1.00 u	6.00 f	0.04 u	3.40 f	3.00 u	5.50 f
110105B1	910916	11:35	7	30.2	35.40 f	2.40 f	4.00 u	6.00 u	3.00 u	26.70 f	1.00 u	6.20 f	0.04 u	2.40 f	3.00 u	1.30 f
110106B1	910916	11:48	8	30.2	30.80 f	4.00 f	4.00 u	6.00 u	3.00 u	40.50 f	1.00 u	6.60 f	0.04 u	10.00 u	3.00 u	5.00 u
110106B2	910916	11:48	8	30.2	65.50 b	3.80 f	4.00 u	6.00 u	3.00 u	34.60 f	1.00 u	7.10 f	0.04 u	2.40 f	3.00 u	5.00 u
110107B1	910916	11:57	6	30.2	20.30 f	2.00 u	4.00 u	6.00 u	3.00 u	37.00 u	1.00 u	6.60 f	0.04 u	1.30 f	3.00 u	2.30 f
110108B1	910916	12:00	4	30.5	31.80 f	2.00 u	4.00 u	6.00 u	3.00 u	25.90 f	1.00 u	6.90 f	0.04 u	3.40 f	3.00 u	1.00 f
110109B1	910916	13:57	21	30.0	57.20 f	2.00 u	4.00 u	6.00 u	3.00 u	62.60 f	1.00 u	9.70 f	0.04 u	10.00 u	3.00 u	1.00 f
110110B1	910916	14:07	20	30.0	37.20 f	2.00 u	4.00 u	6.00 u	3.00 u	38.30 f	1.00 u	7.10 f	0.04 u	7.70 f	3.00 u	5.00 u
110111B1	910916	14:20	19	30.0	42.00 f	2.00 u	4.00 u	6.00 u	2.20 f	34.20 f	1.00 u	6.90 f	0.04 u	16.80 f	3.00 u	5.00 u
110112B1	910916	14:35	18	30.0	42.30 f	2.00 u	4.00 u	6.00 u	3.00 u	41.00 f	1.00 u	6.30 f	0.04 u	10.00 u	3.00 u	5.00 u
110113B1	910916	14:47	17	29.2	16.10 f	1.60 f	4.00 u	6.00 u	3.00 u	24.00 f	1.00 u	9.10 f	0.04 u	3.60 f	3.00 u	5.00 u
110114B1	910916	15:00	14	30.0	62.80 b	1.20 f	4.00 u	6.00 u	2.20 f	47.20 f	1.00 u	8.20 f	0.04 u	10.00 u	3.00 u	5.00 u
110115B1	910917	11:40	10	29.0	32.50 f	1.20 f	4.00 u	6.00 u	3.00 u	25.20 f	1.00 u	5.70 f	0.04 u	10.00 u	3.00 u	1.20 f
110116B1	910917	12:00	12	29.2	27.00 f	2.00 u	1.00 f	6.00 u	3.00 u	39.00 f	1.00 u	5.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110117B1	910917	12:15	13	29.5	31.00 f	2.00 u	1.00 f	6.00 u	3.00 u	43.00 f	1.00 u	6.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110119B1	910917	12:40	15	29.2	36.00 f	2.00 u	1.00 f	6.00 u	3.00 u	51.00 f	1.00 u	10.00 f	0.04 u	10.00 u	3.00 u	1.00 f
110119B2	910917	12:40	15	29.2	27.00 f	2.00 u	2.00 f	6.00 u	3.00 u	51.00 f	1.00 u	10.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110118B1	910917	14:07	9	29.5	33.00 f	2.00 u	1.00 f	6.00 u	3.00 u	41.00 f	1.00 u	6.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110120B1	910917	14:20	16	26.8	49.00 f	2.00 u	3.00 f	6.00 u	1.00 f	70.00 f	1.00 u	11.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110121B1	910917	14:35	11	29.0	19.00 f	2.00 u	1.00 f	2.00 b	1.00 f	52.00 f	1.00 u	9.00 f	0.04 u	10.00 u	3.00 u	1.00 f
110122B1	910917	15:00	1	28.9	64.00 f	2.00 u	4.00 u	6.00 u	3.00 u	61.00 f	1.10 f	7.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110123B1	911113	10:00	23	28.0	188.00 b	2.00 u	3.00 f	6.00 u	3.00 u	298.00 b	1.80 b	14.00 f	0.04 u	10.00 u	3.00 u	4.00 f
110124A1	911113	11:50	15	22.2	82.80 b	2.00 u	4.00 u	6.00 u	3.00 u	99.00 b	1.00 u	9.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110125A1	911113	13:00	10	24.0	51.00 f	2.00 u	4.00 u	6.00 u	3.00 u	98.00 b	3.40 b	7.00 f	0.04 u	10.00 u	3.00 u	6.00 f
110126A1	911113	13:30	8	23.5	57.00 f	2.00 u	4.00 u	6.00 u	3.00 u	99.00 b	1.00 u	6.00 f	0.04 u	10.00 u	3.00 u	2.00 f

(Contd)

EPAID	CDATE	CTIME	STA	SAL	Al	As	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn
(B) WATER (cont)																
110127A1	911113	13:45	1	24.0	22.00 f	2.00 u	4.00 u	3.00 f	2.00 f	95.00 b	1.00 u	7.00 f	0.04 u	46.00 b	3.00 u	4.00 f
110431A1	911217	07:56	1	19.0	163.00 b	2.00 u	1.00 f	2.00 f	3.00 f	88.00 f	1.00 u	7.00 f	0.04 u	3.00 f	3.00 u	7.00 f
110432A1	911217	09:15	10	19.9	41.00 f	2.00 u	4.00 u	6.00 u	3.00 u	47.00 f	1.00 u	1.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110432A2	911217	09:15	10	19.9	41.00 f	2.00 u	2.00 f	6.00 u	3.00 u	57.00 f	1.00 u	3.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110433A1	911217	10:10	8	23.5	82.00 b	2.00 u	4.00 u	13.00 f	6.00 f	86.00 f	1.00 u	4.00 f	0.04 u	7.00 f	3.00 u	3.00 f
110434A1	911217	13:40	15	20.0	153.00 b	2.00 u	4.00 u	5.00 f	3.00 f	194.00 b	1.00 u	11.00 f	0.04 u	10.0 u	3.00 u	5.00 f
110435A1	911231		23	28.00	165.00 b	2.00 u	4.00 u	5.00 f	4.00 f	184.00 b	1.00 u	8.00 f	0.04 u	3.00 f	3.00 u	2.00 f
110436A1	920115	08:15	23	21.0	171.00 b	2.00 u	3.00 f	6.00 u	3.00 u	189.00 b	1.00 u	6.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110437A1	920116	08:30	1	24.0	44.00 f	2.00 u	1.00 f	6.00 u	2.00 f	89.00 f	1.50 b	6.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110438A1	920116	09:00	8	31.0	13.00 f	1.60 f	1.00 f	6.00 u	3.00 u	90.00 b	1.00 u	4.00 f	0.04 u	10.00 u	3.00 u	4.00 f
110439A1	920116	09:30	10	30.0	24.00 f	2.00 u	4.00 u	6.00 u	3.00 u	79.00 f	1.30 f	2.00 f	0.04 u	10.00 u	3.00 u	6.00 f
110440A1	920116	10:00	16	23.0	79.00 b	2.00 u	4.00 u	6.00 u	3.00 u	94.00 b	1.00 u	2.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110441A1	920116	10:30	15	22.0	91.00 b	2.00 u	4.00 u	6.00 u	3.00 u	133.00 b	1.00 u	7.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110442A1	920217	10:38	1	26.0	12.00 f	2.00 u	4.00 u	6.00 u	3.00 u	72.00 f	1.00 u	5.00 f	0.04 u	10.00 u	3.00 u	2.00 f
110443A1	920217	11:10	8	28.0	46.00 f	2.00 u	1.00 f	6.00 u	2.00 f	109.00 b	1.10 f	3.00 f	0.04 u	10.00 u	3.00 u	6.00 f
110444A1	920217	11:25	10	28.2	40.00 f	2.00 u	2.00 f	6.00 u	1.00 f	89.00 f	1.70 b	3.00 f	0.04 u	10.00 u	3.00 u	4.00 f
110445A1	920217	11:47	15	28.5	26.00 f	1.10 f	4.00 u	6.00 u	12.00 f	81.00 f	1.00 u	2.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110446A1	920217	11:58	16	28.2	54.00 f	2.00 u	2.00 f	6.00 u	3.00 u	89.00 f	1.00 f	5.00 f	0.04 u	10.00 u	3.00 u	2.00 f
110447A1	920218	08:15	23	28.2	135.00 f	2.00 u	3.00 f	6.00 u	3.00 u	136.00 b	1.00 u	4.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110451A1	920305	09:27	15	24.9	19.00 f	2.00 u	1.00 f	13.00 f	3.00 u	52.00 f	1.00 u	7.00 f	0.04 u	10.00 u	3.00 u	2.00 f
110452A1	920305	09:42	16	26.2	84.00 u	1.90 f	4.00 u	6.00 u	3.00 u	43.00 f	1.00 u	7.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110449A1	920305	10:15	8	26.5	84.00 u	1.30 f	4.00 u	2.00 f	3.00 f	50.00 f	1.00 u	8.00 f	0.04 u	5.00 f	3.00 u	3.00 f
110448A1	920305	10:45	1	25.9	84.00 u	2.00 u	4.00 u	6.00 u	3.00 u	31.00 f	1.00 u	6.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110450A1	920305	11:05	10	27.1	84.00 u	1.70 f	4.00 u	6.00 u	3.00 u	33.00 f	1.00 u	3.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110453A1	920305	12:00	23	29.1	45.00 f	2.00 u	7.00 f	6.00 u	3.00 u	26.00 f	1.00 u	4.00 f	0.04 u	10.00 u	3.00 u	10.00 f
110454A1	920422		23	20.5	102.0 b	1.00 f	4.00 u	6.00 u	3.00 u	122.00 b	1.00 u	8.00 f	0.04 u	4.00 f	3.00 u	5.00 u
110455A1	920423		1	26.0	130.0 b	1.10 f	4.00 u	6.00 u	3.00 u	220.00 b	1.00 u	9.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110456A1	920423		8	26.2	35.0 f	2.00 u	4.00 u	5.00 f	6.00 f	45.00 f	1.00 u	5.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110457A1	920423		10	23.5	62.0 b	2.00 u	4.00 u	6.00 u	6.00 f	107.00 b	1.00 u	9.00 f	0.04 u	10.00 u	3.00 u	4.00 f
110457A2	920423		10	23.5	145.00 b	1.20 f	2.00 f	6.00 u	8.00 f	109.00 b	1.20 f	9.00 f	0.04 u	11.00 f	3.00 u	5.00 f
110458A1	920423		15	22.5	115.00 b	2.00 u	4.00 u	6.00 f	9.00 f	143.00 b	1.00 u	12.00 f	0.04 u	5.00 f	3.00 u	2.00 f
110459A1	920423		16	22.9	108.00 b	2.00 u	4.00 u	8.00 f	6.00 f	125.00 b	1.00 u	10.00 f	0.04 u	10.00 f	3.00 u	1.00 f
110460A1	920520		15	25.5	82.00 b	1.20 f	2.00 f	6.00 u	3.00 u	174.00 b	1.00 u	17.00 b	0.04 u	10.00 u	3.00 u	2.00 f
110461A1	920520		16	25.2	55.00 f	2.00 u	4.00 u	4.00 f	3.00 f	141.00 b	1.30 f	13.00 f	0.04 u	10.00 u	3.00 u	3.00 f
110462A1	920520		8	24.2	39.00 f	2.00 u	4.00 u	6.00 u	4.00 f	78.00 f	1.00 u	10.00 f	0.04 u	3.00 f	3.00 u	1.00 f
110463A1	920520		10	23.7	28.00 f	2.00 u	4.00 u	6.00 u	2.00 f	97.00 b	1.00 u	12.00 f	0.04 u	10.00 u	3.00 u	2.00 f
110464A1	920520		1	23.7	59.00 f	2.00 u	4.00 u	6.00 u	3.00 u	59.00 f	1.00 u	8.00 f	0.04 u	10.00 u	3.00 u	2.00 f
110465A1	920521		23	25.1	72.00 f	2.00 u	4.00 u	6.00 u	3.00 u	77.00 f	1.00 u	7.00 f	0.04 u	10.00 u	3.00 u	5.00 u

(Contd)

EPAID	CDATE	CTIME	STA	SAL	Al	As	Cd	Cr	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn
(B) WATER (cont)																
110466A1	920615		23	25.5	85.00 b	2.00 u	4.00 u	6.00 u	3.00 u	70.00 f	1.00 u	10.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110467A1	920616		15	24.0	87.00 b	2.00 u	4.00 u	6.00 u	16.00 f	95.00 b	1.00 u	17.00 b	0.04 u	10.00 u	3.00 u	6.00 f
110467A2	920616		15	24.0	85.00 b	2.00 u	4.00 u	6.00 u	15.00 f	92.00 b	1.00 u	17.00 b	0.04 u	10.00 u	3.00 u	4.00 f
110468A1	920616		16	23.8	79.00 b	2.00 u	4.00 u	6.00 u	4.00 f	88.00 f	1.00 u	18.00 b	0.04 u	10.00 u	3.00 u	2.00 f
110469A1	920616		10	25.0	97.00 b	2.00 u	4.00 u	6.00 u	3.00 u	105.00 b	1.00 u	16.00 f	0.04 u	10.00 u	3.00 u	2.00 f
110470A1	920616		8	27.0	41.00 f	2.00 u	4.00 u	6.00 u	3.00 u	39.00 f	1.00 u	10.00 f	0.04 u	10.00 u	3.00 u	5.00 u
110471A1	920616		1	29.0	48.00 f	2.00 u	4.00 u	6.00 u	3.00 u	34.00 f	1.00 u	10.00 f	0.04 u	10.00 u	3.00 u	2.00 f

7. ORGANOTIN COMPOUNDS

VARIABLE	DESCRIPTION
WETWGHT	Sample weight (grams).
DRY:WET	Dry to wet ratio
MBT	Monobutyltin chloride concentration, µg/g dry wt.
DBT	Dibutyltin chloride concentration, µg/g dry wt.
TBT	Tributyltin chloride concentration, µg/g dry wt.

FLAG LEGEND:

Chromatogram contained large, unresolved peak that involved any TBT and DBT peaks that might have been present.

@ Any DBT peaks were swamped by an unresolved peak similar to that in replicate #1, but TBT peaks were discernible.

ORGANOTIN CHEMISTRY

EPAID	REP	DUP	CDATE	CTIME	STA	WETWGHT	DRY:WET		MBT		DBT	TBT
(A) MUSSEL												
110070	A	1	910912	07:30	17	9.750	0.170	<	0.037		0.068	0.093
110070	A	2	910912	07:30	17	9.670	0.170	<	0.038		0.074	0.156
110071	A	1	910912	08:00	20	4.970	0.170	<	0.073		0.116	0.212
110071	A	2	910912	08:00	20	5.010	0.170	<	0.073		1.132	0.101
110072	A	1	910912	08:25	21	4.500	0.170	<	0.081		0.087	0.083
110072	A	2	910912	08:25	21	4.340	0.170	<	0.084		0.135	0.124
110073	A	1	910916	12:00	1	9.390	0.170	<	0.039		0.068	0.086
110073	A	2	910916	12:00	1	8.920	0.170	<	0.041		0.064	0.089
110074	A	1	910916	12:45	14	8.800	0.170	<	0.041		0.191	0.059
110074	A	2	910916	12:45	14	8.860	0.170	<	0.041		0.192	0.063
110079	A	1	910927	08:15	10A	12.200	0.170	<	0.044		0.047	0.004
110079	A	2	910927	08:15	10A	12.320	0.170	<	0.044		0.046	0.054
110083	A	1	910930	11:30	8	6.390	0.170	<	0.085	<	0.050	0.016
110083	A	2	910930	11:30	8	6.790	0.170	<	0.080	<	0.046	0.021
110084	A	1	910930	11:55	9	7.620	0.170	<	0.071		0.052	0.014
110084	A	2	910930	11:55	9	7.560	0.170	<	0.072		0.066	0.013
110075	B	1	911001	11:45	2	10.710	0.170		0.046		0.086	0.125
110075	B	2	911001	11:45	2	10.210	0.170	<	0.036		0.082	0.117
110087	A	1	911003	13:30	18	9.370	0.170	<	0.058		0.056	0.241
110087	A	2	911003	13:30	18	10.110	0.170	<	0.054		0.041	0.023
110088	A	1	911004	07:58	22	9.030	0.170	<	0.060	<	0.035	0.004
110088	A	2	911004	07:58	22	9.180	0.170	<	0.059	<	0.034	0.000
(B) POST DEPLOYMENT MUSSELS												
798954	A	1	911023		2	10.300	0.170	<	0.051		0.057	0.117
798954	A	2	911023		2	10.460	0.170	<	0.049		0.057	0.112
798958	A	1	911023		8	9.710	0.170	<	0.053	<	0.023	0.098
798958	A	2	911023		8	9.660	0.170	<	0.053	<	0.023	0.099
798966	A	1	911023		15	10.360	0.170	<	0.050		0.065	0.120
798966	A	2	911023		15	10.170	0.170	<	0.051	<	0.022	0.119
798970	A	1	911023		19	10.470	0.170	<	0.049		0.047	0.091
798970	A	2	911023		19	10.200	0.170	<	0.051		0.070	0.093
798974	A	1	911023		22	12.640	0.170	<	0.041	<	0.018	0.033
798974	A	2	911023		22	13.310	0.170	<	0.039	<	0.017	0.029
(C) PRE DEPLOYMENT MUSSELS												
798978	A	1	910918			8.960	0.170	<	0.057	<	0.025	0.037
798978	A	2	910918			9.280	0.170	<	0.056	<	0.024	0.034
(D) SEDIMENT GRAB												
110210	C	1	910909	14:09	19	5.170	0.980	<	0.014	<	0.009	0.006
110210	C	2	910909	14:09	19	5.010	0.980	<	0.015	<	0.009	0.010
110210	C	3	910909	14:09	19	5.090	0.980	<	0.015	<	0.009	0.008
110211	B	1	910909	16:05	18	4.940	0.990	<	0.015	<	0.009	0.004
110211	B	2	910909	16:05	18	4.570	0.990	<	0.016	<	0.010	0.002
110211	B	3	910909	16:05	18	4.700	0.990	<	0.016	<	0.009	0.002
110213	B	1	910910	08:30	21	5.000	0.980	<	0.015	<	0.009	0.019
110213	B	2	910910	08:30	21	5.120	0.980	<	0.014	<	0.009	0.001
110213	B	3	910910	08:30	21	5.100	0.980	<	0.014	<	0.009	0.002
110215	B	1	910910	11:35	15	5.050	0.850	<	0.014		0.012	0.005
110215	B	2	910910	11:35	15	5.020	0.850	<	0.014	<	0.006	0.003
110215	B	3	910910	11:35	15	4.950	0.850	<	0.014		0.012	0.002

(Contd)

EPAID	REP	DUP	CDATE	CTIME	STA	WETWGHT	DRY:WET		MBT		DBT	TBT
(D) SEDIMENT GRAB (cont)												
110214	B	1	910910	12:45	14	5.150	0.990	<	0.014	<	0.009	0.000
110214	B	2	910910	12:45	14	4.970	0.990	<	0.015	<	0.009	0.000
110214	B	3	910910	12:45	14	4.950	0.990	<	0.015	<	0.009	0.004
110217	C	1	910910	15:25	17	5.000	0.970	<	0.007	<	0.006	0.000
110217	C	2	910910	15:25	17	5.100	0.970	<	0.006	<	0.006	0.001
110217	C	3	910910	15:25	17	5.495	0.970	<	0.006	<	0.006	0.000
110220	C	1	910911	13:45	10	4.970	0.800	<	0.015	<	0.007	0.015
110220	C	2	910911	13:45	10	4.980	0.800	<	0.015		0.012	0.001
110220	C	3	910911	13:45	10	4.980	0.800	<	0.015		0.011	0.003
110223	C	1	910912	09:55	20	5.080	0.980	<	0.012	<	0.005	0.000
110223	C	2	910912	09:55	20	4.990	0.980	<	0.012	<	0.005	0.000
110223	C	3	910912	09:55	20	5.030	0.980	<	0.012	<	0.005	0.000
110225	C	1	910912	14:05	8	2.960	0.960	<	0.021	<	0.009	0.006
110225	C	2	910912	14:05	8	3.020	0.960	<	0.021	<	0.009	0.000
110225	C	3	910912	14:05	8	3.110	0.960	<	0.020	<	0.009	0.000
110228	B	1	910913	13:50	22	5.100	0.990	<	0.012	<	0.005	0.000
110228	B	2	910913	13:50	22	5.120	0.990	<	0.012	<	0.005	0.000
110228	B	3	910913	13:50	22	5.030	0.990	<	0.012	<	0.005	0.000
110229	B	1	910916	10:05	9	5.150	0.970	<	0.012		0.014	0.038
110229	B	2	910916	10:05	9	5.120	0.970	<	0.012		0.009	0.001
110229	B	3	910916	10:05	9	4.980	0.970	<	0.012	<	0.005	0.000
110230	B	1	910916	11:20	2	4.760	0.970	<	0.013		#	#
110230	B	2	910916	11:20	2	4.640	0.970	<	0.013		@	0.000
110230	B	3	910916	11:20	2	4.610	0.970	<	0.013		@	0.001
110221	B	1	910916	12:15	1	5.090	0.990	<	0.007	<	0.006	0.000
110221	B	2	910916	12:15	1	5.030	0.990	<	0.007	<	0.006	0.000
110221	B	3	910916	12:15	1	4.980	0.990	<	0.007	<	0.006	0.000

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Phase I: Problem Formulation

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13. ABSTRACT *(Maximum 200 words)*

An ecological risk assessment framework was applied to assess the ecological risk of the operations of the Portsmouth Naval Shipyard (PNSY) in Kittery, ME, on the Piscataqua River and Great Bay Estuary located in NH and ME. Measures of contamination and biological impact were made on samples collected in depositional areas (eelgrass beds) at sites in the immediate vicinity of the Shipyard and at reference sites located in the Estuary and the York River, ME. Data were collected on sediment texture, sediment toxicity to benthic amphipods, water quality parameters, water-column toxicity to sea urchin gametes, microbial contaminants in sediment and water samples, current patterns, deployed mussel physiology, chemical contamination in sediment, tissue (mussels, oysters, eelgrass, fucoid algae, lobster, and flounder) and water samples, and organic chemical markers. Eelgrass, fucoid algae, lobster, flounder, mussel, and benthic habitats were assessed in the lower estuary.

Although important ecological resources in the estuary appear to be healthy, indications of ecological stress were identified. Results from chemical analyses showed that lead, mercury, nickel, zinc, chromium, and, to a lesser degree, polychlorinated biphenyls are contaminants of concern in the estuary. Results were used to determine appropriate follow-on investigations to characterize risk.

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9,10-anthraquinone
9'-fluorenone
aluminum
ammonium
Ampelisca abdita
Ampelisca sp.
Arbacia punctulata
Aricidea catherinae
Aricidea sp.
arsenic
Ascophyllum nodosum
benthic infauna
benzothiazole
butyltin
cadmium
Capitella capitata
chemical markers
chlorinated pesticides
chlorophyll *a*
chromium
Cirratulidea
Clostridium perfringens
Clymenella torquata
copper
Crassostria virginica
cross-section averaged current
dibenzothiophene
dissolved oxygen
ecological risk assessment
enterococci
grain size
Great Bay, New Hamsphire
Great Bay Estuary, New Hamsphire and Maine
Hazardous and Solid Waste Act
Homarus americanus
iron
lead
linear alkylbenzenes
Little Bay, New Hampshire
longitudinal current
macroinvertebrates
manganese
mercury
Mytildae
Mytilus edulis
nitrate
nickel
nonylphenol
Oligochaeta
performanced-based quality assurance
pentacyclic triterpane
pH
phaeopigments
phosphate
Phoxocephalia holbolli
Piscataqua River, New Hamsphire and Maine
polychlorinated biphenyl congeners
polycyclic aromatic hydrocarbons
Psedopleuronectes americanus
Pygospio elegans
Resource Conservation and Recovery Act
salinity
silver
Stresblospio benedicti
Scoletema hebes
Scoletema sp.
Scope for Growth
sediment toxicity
suspended solids
temperature
tin
total organic carbon
trialkylamines
volatile organic compounds
water toxicity
York River, Maine
zinc
Zostera marina